

CEYLON.



PART IV.—EDUCATION, SCIENCE, AND ART (D).

Administration Report of the Director of Agriculture for 1927.

(F. A. STOCKDALE, Esq.)

AUGUST, 1928.

Ordered by His Excellency the Governor to be Printed, July 14, 1928.

COLOMBO :

H. ROSS COTTLE, GOVERNMENT PRINTER, CEYLON.

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DEPARTMENT OF AGRICULTURE.

REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1927.

SECTION I.

AGRICULTURE IN CEYLON.

THE year under review was a prosperous one for the staple agricultural crops, but was generally unsatisfactory for the paddy crops. The weather conditions were favourable for tea and rubber, but coconut crops were short on account of a general shortage of rainfall in the principal coconut districts during the previous year. The rainfall during the first three months of the year was decidedly above the average particularly in the hill country. Whilst this rainfall was favourable to tea and rubber, it resulted in much of the maha crop of paddy being lodged and even spoiled. Much of this paddy had to be reaped in wet weather and some of it had to be recovered from flooded fields. This resulted in reduced crops of poor quality and rendered most of the grain unfit for seed purposes. Paddy which was harvested late was seriously damaged and only a limited number of growers secured really good seed paddy. The rainfall in April was irregular. Thunderstorms occurred frequently during the early part of the month and these were followed by a dry period during the middle of the month and heavy rains particularly in the low-country around Colombo. The rainfall during May was also above the average especially in the south-west quarter of the Island, and typical monsoon activity was experienced in June up to the third week. Thereafter, the monsoon was weak and the rainfall was on the whole slightly below the average. In July, the rainfall was in deficit over 4/5th of the Island, with winds distinctly above the average especially up-country. The weak monsoon was favourable for the tea crops, especially after the abnormally wet first quarter of the year, but in some areas flushing was stopped by the very high winds experienced during the month of July. During August the rainfall was low over the whole of the Island and the deficits were considerable on the south-west side. In September, the first week was dry, but thereafter the rain was above the average but was irregularly distributed. The north-east monsoon was however a failure, and rainfall during October was markedly deficient with but only light winds after the middle of the month. Thereafter, until the end of the year, rainfall was short except in parts of upper Uva and Batticaloa during the month of November. In the north of the Island, there was a complete failure of the north-east monsoon and crops failed completely. The severity of the drought in the Northern Province was very marked and crops of paddy in several areas yielded no grain at all, chena crops failed and many irrigation tanks failed to fill. The position was so difficult in the Mullaittivu district that relief works had to be commenced very early.

Tea.

2. The climatic conditions in the tea-growing area were satisfactory. The rainfall during the early months of the year helped to assist crops, whilst the light south-west and north-east monsoons were favourable. The total exports amounted to 225,045,992 lb. of black tea and 1,991,864 lb. of green tea of a total value of Rs. 213,774,632, as against an export of 215,819,449 lb. of black tea and 1,364,217 lb. of green tea of a total value of Rs. 212,163,883 in 1926. There was a fall of exports to America but increases in the amounts sent to Australia and Africa and in particular to Russia. This marked increase of crop was due to the favourable season and to the continued attention to cultivation and manuring. A feature of all well-managed estates has been in recent years the gradually increasing crops resultant from improvements in cultivation methods and liberal manuring. These larger crops are being secured without any fall in quality, and particular attention continues to be given to the production of fine teas of high quality. The year under review produced teas of average quality. There were no outstanding features to record. Price levels were lower and the average price for local sales came to 94 cents per lb., as against 99 cents per lb. during the previous year. High-grown teas commanded a ready sale throughout the year at good prices, but the prices for low-grown teas were at times considerably below the price levels of the previous year. The general prices were low at the beginning of the year, and showed an improvement in the middle but fell away again thereafter on account of increased crops in India.

3. Factory improvements continue to be made and engineering firms have had a busy year in remodelling and enlarging existing factories and in erecting new ones. Controlled withering still continues to receive special attention and the general adoption of this system is assisting in securing an even wither and a general evening-up of quality. A number of visitors from the tea-growing districts of North India have inspected Ceylon factories during the year, with a view

to adopting some of the Ceylon factory methods to Indian conditions. Several new factories for dealing with bought-leaf have been started during the year and in some instances there has been a semblance towards co-operative working. There appears to be a decided possibility before a co-operative system of running bought-leaf factories and small growers would profit from the establishment of such a system.

4. Tea continues to look healthy and vigorous. New lands are being opened up, but the area of such new lands is restricted in extent. Small growers are continuing to open up lands and in some cases other crops are being cut out. In many cases lands are being planted up with inferior seedlings of poor jat, but if growers have difficulties in securing good supplies for planting they can receive advice from the Department, whose officers inspect annually large numbers of nurseries. It is most important that tea lands should be planted up with only good jat supplies, and the present system is being watched carefully with a view to determining whether steps should be taken to enforce the registration of tea seed gardens and to provide for the sale of plants under guarantee. The total number of plants transferred under permit during the year was 4,555,479, as against 4,451,877 during the previous year.

5. Increased attention continues to be given to the question of soil erosion and particularly to the improvement of the organic matter in tea soils. The use of green manure crops is continuing to extend and several new ones are under experiment. In the highest areas above the mist-zone, particularly around Nuwara Eliya, it has been found necessary to cut out the *Acacia decurrens* on account of its being a host plant of *Cercospora theae* which spreads from it to tea. So far it has not been found possible to secure another leguminous plant to replace it, but estates up-country must continue to make experiments in this direction. Further suitable green manures are required for a number of tea-growing areas, and these can only be ascertained as the result of trial and experiment. *Indigofera endecaphylla*—the most suitable cover crop so far found for tea in Ceylon—is being spread gradually on a number of estates. It appears to be giving satisfactory results and its effect in the tea plots of the Experiment Station, Peradeniya, continue to be watched with interest. The data so far secured indicate that its general use as a cover crop in tea can be recommended. The soil under the *Indigofera* was covered with decaying leafy matter and was in a good state of tilth—being much more friable and in a very superior condition to the soil of the neighbouring clean-weeded plots. Determinations of soil moisture in plots with and without *Indigofera* cover have also been ascertained and the results seem to indicate that when cover crops are grown on soils there is a loss of moisture during the first two years and that afterwards the reverse occurs. There are also distinct indications of an improvement in the organic matter in the soil even after two years. There would appear to be no reason why *Indigofera endecaphylla* should not, if treated correctly from an agricultural point of view, provide a means of building up again many of the badly washed tea soils.

6. Tea Tortrix caused serious damage during the year in several districts. There are also indications that it is becoming more common in districts in which it occurred but rarely in former years. Its range of spread also appears to have widened. Possible control measures were considered during the year, and it was decided by the Estate Products Committee of the Board of Agriculture to have the Tea Tortrix declared as a pest, with the provision that all egg masses, larvae and pupae on tea must be collected and destroyed. This regulation was in force during the last quarter of the year and 71,059,886 egg masses were collected according to reports submitted to the Department of Agriculture. The effect of this egg mass collection is to be reviewed again after two years; in the meantime the Tea Research Institute is making investigations into the possibilities of biological control of the pest. Tea termites continue the most serious problem the tea industry has to face at the present time. Entry into bushes occurs in a number of cases through wounds caused by wood rot, and there is little doubt that control measures will have to aim at the reduction of wood rot and die-backs after pruning, and to the destruction, if possible, of the termites after they have infested the bushes. Experiments with various substances for filling wood rot cavities continue, but so far no really satisfactory substance has been found. The termite investigations have been continued by the Entomological division of the Department and advantage was taken of the leave of Mr. Jepson, Assistant Entomologist, to allow him to proceed to America to confer with other specialists dealing with termites attacking living plant tissues.

7. The change in method of handling young tea described at a meeting of the Estate Products Committee of the Board of Agriculture during the year has attracted a considerable amount of attention and caused discussion in planting circles. Changes are also taking place in the systems of pruning. Much lighter pruning is now being done; with, it is claimed, a considerable reduction in the number of deaths of bushes after pruning and with a very large reduction in the amount of die-backs. If the amount of die-back after pruning can be reduced effectively by this system, this alone would commend its adoption. It has, however, been found that tea comes back into plucking much earlier when this system of light pruning is adopted and the spread of the bushes can be effectively encouraged.

Rubber.

8. The exports of rubber amounted to 60,728 tons of a value of Rs. 129,757,640, as against 63,621 tons of a value of Rs. 184,423,215 during 1926. The export of latex amounted to 250 gallons of a value of Rs. 997. The Restriction Scheme was in force throughout the year, but the pivotal price level was not maintained. The percentages of standard production which were allowed to be exported were 80 per cent. for January, 70 per cent. from February to April, and 60 per cent. from May to December. Prices were lower, but were more or less uniform during the year, but the tone of the market throughout was weak and uncertain. The average price for top grades on the Colombo market was 95 cents, as compared with Re. 1.21 during 1926. Certain changes were made in the regulations under the Restriction Scheme during the year. These were designed to prohibit the sale of surplus rubber without coupons and to check the

import of inferior grades from India for replacement by top-grade sheet or crepe. The Restriction Ordinance was also amended during the last month of the year in order to make it possible to allocate accumulated funds in excess of Rs. 100,000 for the purpose of research work and for other objects designed to benefit the industry.

9. The quality of both crepe and sheet rubber was well maintained during the year. Rust in sheet is now uncommon and mould is much less common. The use of paranitrophenol as a preventive of mould in sheet continues to extend and this has been experimented with in the treatment of spots in crepe. Formic acid has been found to be as satisfactory a coagulant as acetic acid and is gradually replacing it on account of its being more economical. Certain complaints have been received from the manufacturers of certain classes of rubber goods that these articles have a slight greenish tinge when made with rubber prepared with formic acid. This colour is very slight and is hardly to be detected by the uninitiated, and it is unlikely that this difference in a small class of manufactured goods is likely to influence the market which has accepted formic-acid-prepared rubber without comment. One may, therefore, look forward to a greater use of formic acid as a coagulant in the future. The economy in using formic acid has been clearly indicated by Mr. O'Brien, Chemist to the Rubber Research Scheme, who shows that under Ceylon conditions 1 lb. of 90 per cent. formic acid coagulates 300 lb. of sheet rubber, as against 180 lb. by acetic acid, and 330-360 lb. of crepe, as against 200-220 lb.; whereas the price differences are only as formic: acetic as 48:58.

10. Secondary leaf fall caused by *Phytophthora* was much less common during the year and in no district was any outbreak at all serious. On the other hand, the leaf disease caused by *Oidium* was much more common, especially in the drier areas, and is causing some anxiety to a few estates. A secondary form of this disease appeared on older leaves and has been the subject of investigation (see *Tropical Agriculturist*, September, 1927, page 147) by Mr. M. Park. It is possible that manuring has had a favourable effect on the incidence of secondary leaf fall caused by *Phytophthora*, and it is to be hoped that the *Oidium* leaf-fall may likewise be rendered less severe by liberal manuring with nitrogenous fertilizers. The direct control of the *Oidium* disease is not thought to be feasible and indirect methods must therefore be employed. In outbreaks of the secondary attack on older leaves, spraying may be useful, but the expense and difficulties of spraying rubber under Ceylon conditions are considerable. Brown bast continues to increase in the drier areas and the percentage of affected trees on a few estates is now high. The treatment of this disease has been carefully studied by Mr. Mitchell of the Rubber Research Scheme, and a full account of the scraping and isolation method recommended for Ceylon conditions was given at the 1927 Agricultural Conference. This scraping method has been quite successful and bark renewal after treatment has come up to expectations. There is however no doubt that brown bast will become more prevalent when full tapping is again resumed, and that crop yields, particularly in the drier areas, will be reduced by it. This fact has already been realized by a few estates in the drier regions at high elevations and steps are being taken to replace rubber in such areas by tea. *Rhizoctonia bataticola* has been found alone in the roots of rubber and, associated with other fungi reputed to be responsible for root diseases. Work on these root diseases still continues, and it is hoped that the position will become clear at an early date.

11. The prevention of soil erosion has received further attention on rubber estates. The spread of *Vigna* (*Dolichos Hosei*) has been considerable during the year, but there are still large areas in which it is not being used. This plant has shown itself to be well suited for growth under the shade of rubber, but it is difficult, in certain areas, to establish. The agricultural treatment of this plant is the subject of experiment and its use is certain to extend as its value and agricultural treatment have been further demonstrated. In some areas where *Vigna* has been found difficult to establish *Centrosema pubescens* has been tried with success, but as a general rule in Ceylon this plant will not thrive in as dense shade as the former. The terracing of young clearings has been done in a few cases, but this method of preventing the loss of good top-soil is not as general as could be looked for. Careful records of the cost of contour terracing have been kept of some work done on the Experiment Station, Peradeniya, and show that Rs. 84.68 per acre may be taken as an average cost for such work.

12. Continued interest has been taken in the selection of high-yielding strains of rubber. Yield records have been taken on all the rubber owned by the Department of Agriculture and upon a fair number of estates. Some estates have combined in a programme of investigation and experiments, and are establishing bud-wood nurseries and clones of budded trees from high-yielding mother trees. Definite plans of work have been elaborated during the year and with the liberation of funds from the Rubber Restriction Fund, definite tests of budded areas from known mother trees of high yield will be possible and the establishment of isolated seed gardens carried out. The industry in Ceylon looks to greater commercial success from seed selection than from the establishment of areas of budded plants. Budding is regarded as a ready vegetative means of isolating trees of high value and thereby establishing seed gardens from which selected seed can be secured. The value of selected seed is demonstrated by the following figures obtained from the Experiment Station, Peradeniya:—

Yields of the Progeny of Henaratgoda No. 2 Tree.

1923 — 446	lb. per acre (trees 10 years old).
1924 — 653	do.
1925 — 662	do.
1926 — 559	do. (new panel).

Yield of Unselected Trees of approximately similar Age.

1923 — 317	lb. per acre (trees 10 years old).
1924 — 449	do.
1925 — 469	do.
1926 — 417	do. (new panel).

Budded rubber has not, however, been available up to the present in Ceylon for full tapping. Certain areas will be ready for continuous tapping in 1928 or 1929 and the commercial possibilities of such budded areas can then be put to test. There was a keen demand for rubber seed from trees on the Experiment Station and Gardens of the Department. The same policy of separate collection from high-yielding trees was adopted as in the previous year, and the following statement shows the seed supplied:—

Group 1.—Selected seed from high yielders	..	..	84,000
Group 2.—Seed from the progeny of No. 2 tree, Henaratgoda	..	..	147,000
Group 3.—Unselected	..	..	918,000
			1,149,000

In addition a number of seeds from special trees was selected for sowing in the nurseries of the Department and on the Experiment Station of the Rubber Research Scheme for experimental purposes. Bark examinations were made by Mr. Haigh during the year of trees growing at Peradeniya and Henaratgoda with a view to selecting a number of high yielders for further experimental work.

13. The Rubber Research Scheme had 214 subscribers at the end of 1927, as against 211 during the previous year. Its work continues to be appreciated by the industry. The quarterly circulars prepared by officers of the scheme have been published in the *Tropical Agriculturist* for general information, and it is hoped that when restriction is removed, steps will be taken for the whole industry to support the special research work required by it.

Coconuts.

14. The exports of coconut products and their values during 1927 were as follows:—

				Rs.
Coconuts, fresh	..	..	18,875,750 nuts	1,515,087
Copra	..	..	1,982,154 cwt.	31,844,823
Desiccated	..	..	872,833 cwt.	20,481,761
Oil	..	..	673,152 cwt.	16,567,551
Poonac	..	..	173,155 cwt.	1,241,983
Fibre, bristles	..	..	170,728 cwt.	1,569,904
Fibre, mattress	..	..	365,121 cwt.	1,313,404
Coir yarn	..	..	130,821 cwt.	2,177,824

These figures show a total fall in the value of exports of Rs. 2,072,744. This is accounted for mainly by a short fall in crops particularly in the second part of the year as the result of short rainfall during the previous twelve months. This fall in exports attracted attention and resulted in an investigation being made of the exports of coconut products during the past seventeen years. This investigation gave the following results:—

Year.		Oil. Tons.		Copra. Tons.		Desiccated. Tons.		Coconut.
1911	..	25,251	..	41,091	..	14,610	..	15,723,393
1912	..	20,089	..	30,704	..	13,940	..	16,010,809
1913	..	27,349	..	55,865	..	15,190	..	16,861,324
1914	..	24,314	..	70,597	..	15,593	..	11,429,594
Total	..	97,003		198,257		59,333		60,025,120
1915	..	25,075	..	60,426	..	17,450	..	5,827,669
1916	..	16,151	..	65,497	..	15,307	..	4,694,297
1917	..	21,735	..	53,935	..	13,603	..	5,289,481
1918	..	26,374	..	63,616	..	10,168	..	6,553,278
Total	..	89,335		243,474		56,528		22,364,725
1919	..	33,800	..	87,976	..	33,753	..	3,390,710
1920	..	25,376	..	67,893	..	25,937	..	9,776,479
1921	..	24,236	..	68,372	..	43,526	..	23,738,542
1922	..	27,731	..	84,329	..	38,411	..	22,317,747
Total	..	111,143		308,570		141,627		59,223,478
1923	..	24,027	..	50,773	..	40,940	..	15,693,670
1924	..	27,631	..	88,459	..	43,567	..	29,121,041
1925	..	30,890	..	113,686	..	39,708	..	23,288,786
1926	..	28,523	..	120,970	..	37,718	..	16,951,368
1927	..	33,658	..	99,108	..	43,875	..	18,875,750
Total	..	144,729		472,996		205,808		103,930,615

Mr. Rutherford, in a previous survey of the coconut industry, adopted for his conversion of oil, copra, and desiccated coconuts the following:—

1 ton of oil	=	8,125 nuts
1 ton of copra	=	5,000 nuts
1 ton of desiccated	=	6,900 nuts

Similar conversion figures have been adopted in this survey and the following data obtained:—

Statement showing the Annual Quantity of Coconuts utilized in the various Products Exported from Ceylon.

Year.	Oil.	Copra.	Desiccated.	Fresh Nuts.	Total as Nuts.
1911	205,164,375	205,455,000	100,809,000	15,723,393	527,151,768
1912	163,223,125	153,520,000	95,186,000	16,010,809	427,939,924
1913	222,210,625	279,325,000	104,811,000	16,861,324	623,207,949
1914	197,551,250	352,985,000	107,591,700	11,429,524	669,557,474
Total	788,149,375	991,285,000	408,397,700	60,025,050	2,247,857,115
Average annum	per 197,037,344	247,821,250	102,099,425	15,006,262	561,964,281
1915	203,734,375	302,130,000	120,405,000	5,827,669	632,097,044
1916	131,226,875	327,485,000	105,618,300	4,694,297	569,024,472
1917	176,596,875	269,675,000	93,860,700	5,289,481	545,422,056
1918	214,288,750	318,080,000	70,159,200	6,553,278	609,081,228
Total	725,846,875	1,217,370,000	390,043,200	22,364,725	2,355,624,800
Average annum	per 181,461,719	304,342,500	97,510,800	5,591,181	588,906,200
1919	274,625,000	439,880,000	232,895,700	3,390,710	950,791,410
1920	206,180,000	339,465,000	178,965,000	9,776,479	734,386,779
1921	196,917,500	341,860,000	300,329,400	23,738,542	862,845,442
1922	225,314,375	421,645,000	265,035,900	22,317,747	934,313,022
Total	903,036,875	1,542,850,000	977,226,000	59,223,478	3,482,336,653
Average annum	per 225,759,219	385,712,500	244,306,575	14,805,869	870,584,163
1923	195,219,375	253,865,000	282,486,000	15,693,670	747,264,045
1924	224,501,875	442,295,000	300,612,300	29,121,041	996,530,216
1925	250,981,250	568,430,000	273,985,200	23,288,786	1,116,685,236
1926	231,749,375	604,850,000	260,254,200	16,951,368	1,113,804,943
1927	273,471,250	495,540,000	301,129,800	18,875,750	1,089,016,800
Total	1,175,923,125	2,364,980,000	1,418,467,500	103,930,615	5,063,301,240
Average annum	per 235,184,625	472,995,000	283,693,500	20,786,123	1,012,660,248

The total nuts exported during the four-yearly periods specified above have been as follows:—

1911-1914	2,247,856,125 = 100	1923-1926	3,974,284,440 = 177
1915-1918	2,355,624,800 = 105		
1919-1922	3,482,336,653 = 155	1927	1,089,016,800 = 48

The war period shows but slight increases, undoubtedly due to shortage of freight and to increased local consumption during this period. It is possible that the export averages for the period 1919-1922 were higher than they would have been normally owing to the clearing out of stocks after the termination of war, but it is significant that the average export of coconut products for the four-yearly period 1923-1926 was 77 per cent. higher than for the four-yearly period 1911-1914. Mr. Rutherford in 1922, in his calculations eliminated the year 1914 and based his percentage increases upon the averages of the three years, 1911-1913. He found that the production for export had shown an increase at the rate of 5 per cent. per annum or 60 per cent. in the twelve years. Using the same basis of calculation it is found that the average annual export for the period 1923-1926 was 89 per cent. in excess of the basic averages or a rate of increase equal to 5.6 per cent. per annum. This steady increase is due to young plantations coming into bearing and to a higher state of cultivation. If the rate is to be continued there is little doubt that more widespread attention must be given to better cultivation and manuring. If the total acreage of Ceylon coconuts was highly cultivated very marked increases in exports would be possible.

15. Prices for copra were steady during the year, but they were lower than during the previous year. Prices for oil were satisfactory and an increase in exports took place, probably on account of a readjustment of the export duty on oil. From January 16 the export duty on desiccated coconut was reduced from 70 cents to 65 cents per cwt. and on oil from 75 cents to 65 cents per cwt. Previous duties had been in favour of copra, and the advance in the exports of oil with a corresponding decline in the exports of copra is the result of this readjustment. Prices for desiccated coconut were again unsatisfactory and the trade was generally depressed. Half the mills closed for certain periods of the year. Fibre exports were in excess of previous exports and prices were generally satisfactory.

16. Cultivation methods show little change. Constant monthly harrowings have been found to produce ultimately reductions in crop yields, and this system has now given place to less frequent cultivation with the burial of weeds and the loppings of green crops. The essential in coconut cultivation is the maintenance of organic matter, boga medeloa has been used as a green crop and has given satisfactory results. Trials with creeping cover crops have begun and there is little doubt that the use of such plants as *Dolichos Hosei* will eventually become general on the best cultivated estates in those districts in which it will thrive.

17. Pests and diseases of coconuts during the year call for little comment. The causes of root diseases of coconuts are under investigation by Mr. Park, tapering has been investigated in the field by Mr. de Mel and the indigenous parasites of the coconut caterpillar (*Nephantis serinopa*) are being specially investigated in the North-Western Province. The Department of Agriculture issued during the year three coloured posters dealing with coconut pests and diseases, and these were widely distributed throughout the coconut-growing districts and were also supplied to the schools.

Paddy.

18. The rains of the north-east monsoon in 1926 were late and short. In consequence, a short maha crop resulted. This crop was considerably damaged by most unseasonal rains during the harvest season in the early months of 1927. Much of the crop was ruined, being "lodged" and flooded. The grain was rendered largely unfit for seed purposes, and it was the exception rather than the rule for growers to secure their crops in a fit condition for seed purposes. The yala season was, however, a good one, and crops in excess of the average were generally secured. The north-east monsoon rains at the end of 1927 were short and late. In large tracts, particularly in the Northern Province, a severe drought was experienced. Tanks did not fill and rain-fed crops which were sown with the first showers died out on account of shortage of rain. The result will be a complete failure of crops in the northern areas and a considerable shortage all over the Island.

19. The work of the Department in the production and testing of pure-line strains has been continued, and a number of tested paddies of superior yielding values is now available for the use of cultivators in several localities. Improvement in the technique of testing these paddies have been made and care is taken that no paddy is passed into the hands of growers until it has been thoroughly tested, unless it is handed over to large land holders who are prepared to make experimental tests. There is a gratifying demand for pure-line paddies and steps will have to be taken at an early date to evolve a satisfactory system of seed storage and distribution. A beginning has been made with the multiplication of certain types on growers' lands and this system of private seed farms will have to be developed as tested types become available. In Ceylon, as in other eastern countries, if grown by small holders, pure-line paddies, which should be reserved for seed are often consumed and, in consequence, it is necessary to organize a system of seed farms—preferably in co-operation with landholders—if distribution of seed is to become general. Experiments in the weeding of paddy have demonstrated the economic value of weeding and the increased yields which can be secured when weeding is satisfactorily done. Arrangements have been made for agricultural instructors to arrange to demonstrate the value of weeding in all paddy-growing districts. The value of green manures, such as sunn hemp, has also been demonstrated in the Central division and a special competition to encourage the use of green crops in paddy cultivation was organized.

Cacao.

20. The exports of cacao amounted to 80,797 cwt. of a value of Rs. 2,747,247, as against an export of 64,751 cwt. of a value of Rs. 1,953,684 in 1926. The year was only a fair one for cacao and the main crop was somewhat lower than average. Prices were at a higher level than during the previous year, but the amount of fungus pods was lower than usual. The replacement of cacao by rubber continues in some areas, but on the other hand certain new areas are being planted with cacao, and in some cases robusta coffees are being used as interplanted catch crops in these new cacao areas.

Cardamoms.

21. The exports amounted to 3,177 cwt. of a value of Rs. 850,355, as against 2,848 cwt. of a value of Rs. 842,318 during the previous year. The year was generally favourable and most estates showed increased yields in comparison with the yields of the previous year. Prices were, however, at a lower level, and the interest which was being shown in increased planting of this product was not maintained.

Citronella.

22. The exports amounted to 1,358,191 lb. of a value of Rs. 1,264,745, as against 1,431,351 lb. of a value of Rs. 1,774,826 in 1926. Prices were at a low level throughout the year, and in certain months it was difficult to dispose of stocks. The year as a whole was a very disappointing one for citronella growers. Citronella has grown very satisfactorily on the experimental areas in the Wewagam pattu of the Eastern Province, and a small experimental still is now being erected in this area by the Department of Agriculture.

Cinnamon.

23. The market showed considerable fluctuations and high prices ruled for the greater part of the year. This has stimulated again an interest in the planting of cinnamon and in the possibility of improving existing plantations. The exports of quills amounted to 31,301 cwt. of a value of Rs. 4,558,632, as against 31,241 cwt. of a value of Rs. 3,985,238 during the previous year and of chips to 11,114 cwt. of a value of Rs. 227,611, as against 11,874 cwt. of a value of Rs. 225,012 in 1926.

Fibres.

24. The exports of sisal hemp amounted to 4,140 cwt. of a value of Rs. 120,781, as against 5,236 cwt. of a value of Rs. 167,700 during the previous year. This reduction was due to the closing down of the Maha Illuppallama estate. The Government Experiment Station at Anuradhapura produced 220 cwt. of fibre during the year, but it was unable to work for more

than half the season on account of water shortage. These experiments on a small scale on the Experiment Station have been sufficiently satisfactory to warrant further trials being made in villages where dry land cultivation of a more or less permanent character is desirable. Steps have already been made to start sisal cultivation in a village in the North-Central Province and to erect a small mill for the manufacture of the fibre. This mill it is proposed to erect and run for a few years and then to hand it over to the village co-operative society. A similar experiment is to be made in the Hambantota District, but a beginning there will not be possible until 1929.

25. The exports of kapok amounted to 3,320 cwt. of a value of Rs. 235,248, as against 6,045 cwt. of a value of Rs. 411,953 during 1926. The crop was considerably shorter than in the previous year, but was approximately equal to that of 1925. The trials made with the best Java type of kapok have been satisfactory and an effort is being made to establish kapok as a money crop for the village populations in the more sparsely populated areas of the dry zone.

26. Cotton cultivation, owing to the break in the world's prices, had to be assisted by Government. A subsidy of Rs. 5.50 per cwt. was paid by Government on all seed cotton produced. The crop, which was considerably damaged by the heavy unseasonal rains during the harvesting period, only amounted to 2,000 cwt. of seed cotton. Arrangements were made by Government to purchase the crop on behalf of the Spinning and Weaving Mills at Colombo, and the establishment of three buying stations and stores was completed in the Hambantota District during the year. Three special rotation stations were established and produced their first crops during the year, whilst work on two others was undertaken and crops in them sown for the first time with the north-east rains. Interest continues to be taken by small growers in the Hambantota District in cotton, but the prospects for the 1927-28 crop are not very encouraging on account of the failure of the north-east monsoon rains. Crops on the experiment and rotation stations, however, were promising and seem to indicate that with proper cultivation at the correct season good crops can be grown year after year on the same land in the dry zone. Certain villagers have been impressed by the crops grown on the Embilipitiya station in the Kolonna korale of the Province of Sabaragamuwa and have taken up lands on a system of permanent occupation and cultivation.

Papain.

27. The exports of papain amounted to 83,416 lb. of a value of Rs. 670,974, as against 73,624 lb. of a value of Rs. 621,384 in 1926. Prices ruled high in the earlier part of the year, but they broke towards the middle and showed a considerable fall. The interest which has been stimulated in this crop is, however, being maintained.

Arecanuts.

28. The exports of arecanuts during the year amounted to 118,278 cwt., as against 165,475 cwt. during the previous year.

Tobacco.

29. The exports of White Burley tobacco from the Jaffna District under the Department of Agriculture purchase scheme amounted to 13,328 lb. of cured tobacco and realized prices round 1s. 5d. on the London market. These prices were lower than those realized during the previous year, as the crop was during 1927 badly sun-spotted.

SECTION II.

WORK OF THE DEPARTMENT OF AGRICULTURE.

30. In previous years it has been customary to give full details of the work performed by the various divisions of the Department as annexures to this report. A Yearbook embodying brief accounts of the scientific work carried out was also issued. There was, in consequence, some overlapping by this procedure, and it was therefore decided that the papers which would normally be prepared for the Yearbook should be issued, as they became available, in the *Tropical Agriculturist*—the monthly Journal of the Department—and to issue the annual reports of the several divisions as separates in a more handy form. This method of the issue of annual reports as separates was recommended to Government by the Board of Agriculture and it was readily acceded to, as thereby it will be possible to place in the hands of agriculturists details of the work of the Department in a more accessible form. It will also enable the Department so to arrange its distribution lists as to ensure that information required by any individual agriculturist can be supplied to him in handy form. The various separate reports which will be issued will deal with the following:—

- (1) Report on diseases of plants in Ceylon, including the report of the Mycologist and reports by the several Plant Pest and Disease Inspectors on the occurrence of diseases during the year.
- (2) Report on insect pests in Ceylon, including the report of the Entomologist and reports by the several Plant Pest and Disease Inspectors on the occurrence of pests during the year.
- (3) Report of the Agricultural Chemist.
- (4) Report of the Economic Botanist.
- (5) Report of the work of the Central Experiment Station at Peradeniya.
- (6), (7), (8), (9) Reports on the work of the Divisional Agricultural Officers—Central, Southern, Northern, and North-Western.

The report on the Central Experiment Station at Peradeniya will also serve as the guide to that station and certain portions of the report on paddy selections by the Economic Botanist and of the reports of the Divisional Agricultural Officers will be issued in the vernaculars and distributed to the principal village growers in the several districts. In this way it is thought that the work of the Department will be brought before the reading public in a manner which will be complete as the organization of distribution is gradually built up. Copies of these separate reports will be bound up for distribution to corresponding Departments and Institutions with which exchanges of publications have been arranged and will ensure the continuity of the Year-book from the Department. Its character will be changed by these arrangements, but it will make available a larger number of original articles for publication in the *Tropical Agriculturist*. The annexures to this report will therefore include only those dealing with the division of Systematic Botany and with the work of the Botanic Gardens.

SOIL EROSION.

31. The Department has endeavoured to encourage a sustained interest in this important question. The importance of soil conservation in the hill country is recognized by all and much has been accomplished in recent years. Much, however, still remains to be done, particularly on tea estates. The opening of new tea areas without contour planting is still general and the use of leguminous cover crops in tea is not being extended as rapidly as could be hoped for. It is admitted that there are considerable practical difficulties in adopting the contour system of planting, but these must be overcome, as the Department is convinced that for the prevention of soil erosion in tea the planting of contour hedges of tea at varying distances down the slopes is the most satisfactory method of dealing with an admittedly difficult problem. The use of leguminous cover crops in tea is the subject of careful experiment on the Central Experiment Station at Peradeniya. *Indigofera endecaphylla* has so far been found to be the most suitable cover crop for tea and careful records of the effects of this crop upon the moisture and chemical composition of the soil and upon the yields of tea are being kept. Up to date, it has been established that for the first two years the moisture content of the soil is reduced by the evaporation from the cover crop but afterwards it is increased by reason of the leafy mulch which is formed on the surface of the soil. The soil tilth has also been markedly improved as the result of growing *Indigofera* and cultivation is rendered easier than in uncovered soil. The conclusions drawn from the experiments are summarized by Mr. Holland, Manager of the Experiment Station, as follows:—

- (1) *Indigofera endecaphylla* forms a suitable cover crop for tea and is easily propagated.
- (2) The expenses of controlling and handling the cover crop are largely counterbalanced by savings on other works and the nett additional expenditure is not likely to exceed Rs. 2 per acre per annum.
- (3) Two years experience on the Experiment Station, Peradeniya, indicates that the presence of *Indigofera endecaphylla* has neither depressed nor increased the yield of tea to any marked degree.
- (4) Analyses of soil before and after planting *Indigofera* show a satisfactory increase of organic matter, but the total nitrogen present in the soil has remained more or less stationary.
- (5) Young supplies come on well among *Indigofera* and the plant may be recommended for new clearings.
- (6) Further experience is necessary before it can be definitely stated that the planting of *Indigofera endecaphylla* among tea is a paying proposition; but there are good grounds for hoping that it will prove to be so.

It now remains to establish how such a cover crop as *Indigofera* in tea can be utilized to the greatest advantage. The experiments at Peradeniya do not permit of the *Indigofera* being lopped and buried, as such a treatment would upset the routine treatment which the tea plots had previously had, but it is anticipated that in practice it would be found possible to cut the *Indigofera* and incorporate it into the soil behind the fork when envelope forking is being done. Soil under *Indigofera* is easy to fork and it is quite easy to roll this cover crop back and cut it, as it does not root from every internode as is the case with many other cover crops. The tea in *Indigofera* on the Experiment Station came to its time of pruning in very good condition. It was green, healthy, and vigorous at pruning time and has recovered rapidly, with but a small percentage of losses. The general conclusions which can safely be drawn from the results of the experiments so far obtained indicate that the use of such a cover crop as *Indigofera* can safely be encouraged in tea cultivation in Ceylon. Its use will tend not only to prevent soil erosion, but also provide for the building up of a better soil. The experiments clearly indicate that its extended trial can safely be recommended. A few estates have already established *Indigofera* over considerable areas, and the results so far reported have all been encouraging. There is little doubt that if contour hedge planting were adopted in new clearings and use made of cover crops, such as *Indigofera*, from the beginning in addition to the usual contour drains and silt pits, the loss of valuable top-soil could be reduced to a minimum. The soil erosion experiments on the Experiment Station showed soil losses of 6 tons per acre in series A and 10.9 tons per acre in series B, with a rainfall of 85.58 inches. During the year the several plots were dealt with according to the plan drawn up and the various cuttings have been planted. There has been some difficulty experienced in getting the cuttings properly established, but fairly satisfactory results have been secured. The experiments are still being keenly watched by members of the planting community and should yield results of interest. The demand for seed and cuttings of green manure and cover crops showed a further increase during the year. The Experiment Station, Peradeniya, supplied cuttings and seeds to the value of Rs. 4,108.25 in 1927 as against Rs. 3,053.27 in 1926 and Rs. 2,433.47 in 1925, whilst the Central Seed Store supplied 8,361½ lb.

of seed in 1927 as against 7,161 lb. in 1926 and 6,954 lb. in 1925. The Experiment Station sold 394,000 cuttings and 88 lb. of seed of *Indigofera endecaphylla* as against 99,000 cuttings and 17 lb. of seed during the previous year. This general increasing demand for cuttings and seed of green manure cover crops indicates the efforts that are being made to check soil erosion and to renovate washed-out soils. Much, however, still remains to be done, and until every planter in the up-country realizes that this is his main agricultural problem the situation cannot be considered to be satisfactory. If soil erosion can be checked and general soil condition and tilth maintained, crop yields will be sustained without the aid of increasing quantities of artificial fertilizers and the incidence of pests and diseases will be reduced. As stated above *Indigofera endecaphylla* is still considered to be the most suitable for tea. It will not grow under shade and therefore is of no value in old rubber. *Vigna* (*Dolichos Hosei*) is the most suitable for old rubber. It stands shade well, but is sometimes damaged by snails. Small patches are also killed out in wet weather by *Rhizoctonia solani*. *Vigna* is not easy to establish in all localities. At Peradeniya it has been found difficult to establish, but it was found in 1927 that very much greater success was obtained if, instead of the indiscriminate planting of creepers, only rooted runners of plants were put out. *Centrosema pubescens* forms a good cover at Peradeniya and it can be propagated from seed or cuttings. The cover is thicker than that of *Vigna*, but this plant does not appear to thrive so satisfactorily in the heavy shade of old rubber. It is better suited for young rubber or for new clearings. For the latter also *Calopogonium mucunoides* is being tried. It forms a dense heavy cover and climbing up the young plants must be prevented. On the Experiment Station, Peradeniya, trials are also being made with species of *Mucuna*. Of these, the Chinese velvet bean has given the best cover. The growth of creeping cover crops on the terraced portion of the newly established Kegalla Experiment Station has been very good and has attracted the attention of agriculturists in the district.

32. The trials of indigenous leguminous plants have been continued at the Experiment Station, Peradeniya. *Desmodium triflorum*, *Desmodium heterophyllum*, *Desmodium heterocarpum*, *Dolichos falcatus*, *Pycnospora hedysaroides*, *Phaseolus trinervius*, *Teramnus mollis*, *Sesbania canuabina*, *Crotalaria striata*, and *Crotalaria juncea* are under trial. The two larger *Desmodiums* and *Pycnospora hedysaroides* are useful in new clearings whilst on the Kegalla Experiment Station a spontaneous cover of *Dunbaria heynei* has been encouraged and has grown luxuriantly and formed an excellent cover. In new clearings it is certainly worth a trial, but whether it will grow satisfactorily under shade has still to be ascertained.

USE OF GREEN MANURES.

33. The importance of increasing the organic matter and the humus content of Ceylon soils is now generally recognized. Tea estates are increasing their amount of green manure trees and shrubs, rubber estates are extending the use of *Vigna* (*Dolichos Hosei*) and coconut estates are making greater use of *Boga medeloa* (*Tephrosia candida*) whilst paddy growers particularly in the north are growing larger areas of their paddy fields in sunn-hemp (*Crotalaria juncea*). The agricultural treatment of these crops has received consideration during the year. At the Henaragoda Botanic Gardens complete covers of *Vigna* (*Dolichos Hosei*) and *Centrosema pubescens* in a young clearing planted with *Taraktogenos kurzii* and *Hydnocarpus wightiana* have been forked in. The fork was completely turned and the soil left rough. The subsequent growth was satisfactory and there would seem to be no doubt that this treatment is possible on level friable soils in the low country. This trial indicates that in coconut plantations where creeping cover crops have been established such crops could be ploughed in with benefit and sufficient plant material would remain uncovered to re-establish the growth. Considerable discussion has taken place as to the treatment of *Vigna* in old rubber. Whilst it must be generally accepted that the best results are to be secured if the green material can be buried in old rubber this procedure may not be possible unless the cut leafy material is buried in special pits. Such a measure has been adopted in some estates, but in general the Department does not at present consider the cutting of *Vigna* necessary, but rather favours envelope forking wherever this is possible. There has been some indications of the spread of some root diseases under heavy covers in old rubber. This matter is being carefully watched and it may result in it being found necessary in some areas to cut the *Vigna* at regular intervals and to reduce forking to a minimum. In tea, envelope forking with the pushing of the leafy material behind the fork is likely to be found the most satisfactory method of dealing with cover crops and with the lopping of green manure trees and shrubs. With a view to testing the amount of nitrates added to the soil by the burial of green material from different plants, the Agricultural Chemist and the Manager of the Experiment Station, Peradeniya, carried out an experiment. The results showed that:—

- (1) Maximum nitrate accumulation took place between six and eight weeks after burying the material.
- (2) The amount of nitrate present at any particular time depended on the rainfall in the fortnight previous to sampling; the amount of nitrate varying inversely with the rainfall.
- (3) *Dadaps* and *glicicidia* leaves gave the highest nitrification percentages for Peradeniya conditions; though this will obviously vary with the ages of the material, &c.
- (4) The use of non-leguminous leafy material resulted in as great an accumulation of nitrates as when leguminous crops were used.

PADDY.

34. Manuring, transplanting, ploughing, weeding and green manuring demonstrations have been made in various districts during the year. Weeding has been shown to give increased yields and profits in the Central, North-Western, and Eastern Divisions. Special tests have also been made by the Economic Botanist and increased yields of 35 per cent. secured. The

economic aspect of weeding was also carefully studied and the results circulated to all agricultural officers and to revenue officers for conveyance to the cultivators. In the Central and North-Western Divisions attention is being given to weeding, but in the Eastern Division little progress can be recorded. The system of land leases which prevails in this district, stand in the way, as in several other districts, to improvements being effected rapidly. Increase yields of $2\frac{1}{2}$ amunams per acre are reported from trials in the Batticaloa District, but there is no enthusiasm amongst the cultivators to take to weeding. In some parts of Uva the use of green leaf as manure has spread during the year. Trials and demonstrations with artificial manures have been continued. These have been carried out in co-operation with cultivators and through co-operative societies. Where demonstrations have been given for a year or two arrangements are made to supply the manures at reduced rates until their use becomes established. Bonemeal still remains the most favoured manure, although good results have been obtained from the application of dried fish or of animal meal. Tests with nitrogenous manures are being arranged now that additional lands for paddy have been secured at Peradeniya. The possibilities of a reduction in the seed rate have been demonstrated in the Batticaloa District and the economic value of such a thinner seed rate worked out. Transplanting is being encouraged in some areas by means of competitions, and in Uva some satisfactory improvements were seen on fields entered for paddy competitions which required in their conditions of qualification a thin seed rate and weeding. The economics of transplanting have been studied by the Economic Botanist and a 20 per cent. increase with a profit of Rs. 15 per acre secured. Transplanted paddies also do not lodge so badly as those sown broadcast. Ploughing demonstrations were held in Kegalla and in the Eastern Province and the possibilities of the Burmese harrow have been tested at various centres. It has proved to be of value in some centres for preparing the fields after the first ploughing. The pests and diseases of paddy have been studied by the Plant Pest Inspector in the Southern Division. A sclerotial disease has been found common in some fields and is now under investigation in the Mycological Division. Crabs have been found to be troublesome in the plots of the Economic Botanist at Peradeniya, but satisfactory control has been found to be possible by the use of a rice bran bait in earthenware pots sunk just below water level.

35. The work of the Department in isolating and testing pure-line paddies has made satisfactory progress during the year. The methods of testing on the various paddy stations have been further improved and a standardized system has now been adopted. A large number of new selections have been made at the several paddy stations and the older selections have received further test against the local paddies as controls. A number of paddies are now available for several districts and their value is becoming gradually recognized. B11 and B12 were grown on 95 acres in the Katugastota area for the maha crop and HK13 for the yala season. The latter gave a yield of 42-fold on a privately cultivated area, and is, in consequence, now in demand amongst growers. G3 has shown its value in the Kegalla, Veyangoda, and Ratnapura Districts and may prove to be a satisfactory type for a large area of the low-country on the south-west side of the Island. G1 is a favourite in some places in the North-Western Province and in others the selected lines from Podiwi are in demand. Mb 14 and Mb 27 have given good results in the North-Central and Northern Provinces. The storage of seed paddies has been under consideration during the year and air-tight galvanized bins have been found to be satisfactory for the keeping of special seed paddy. Steps are now being taken to establish private seed farms, on which the tested pure-line paddies can be grown, and it is hoped to arrange for a number of such farms in various parts. Some of the new selections made at the paddy stations in the Southern Province are promising and it is hoped that types suitable for this Province will soon be available. The paddy areas at the Peradeniya and Anuradhapura Experiment Stations and at the Central Agricultural Stations at Galle and Wariyapola will be utilized by the Economic Botanist for the maintenance of purity of seed, and these stations will issue out this seed to the district paddy stations for multiplication and distribution to growers. A detailed report on the results of the paddy work is being issued as a separate report and portions are also being issued in Sinhalese for distribution to growers in those districts where seed of tested pure-line paddies is available.

ROTATION OF CROPS ON LANDS IN THE DRY ZONE.

36. It was possible during the year to secure results from the rotation stations established at Middeniya and Bata-ata in the Hambantota District and at Vavuniya in the Mullaitivu District. The cotton crops on these stations were generally satisfactory, considering the unfavourable season during the early part of the year. Sowing was rather late owing to this being the first year of opening, but growth was satisfactory and was on the whole the best on the Middeniya station. At Vavuniya the cotton crops suffered severely from leaf roller and hand picking had at one stage to be resorted to. Grain crops were satisfactory, but pulse crops except black gram were seriously damaged by the wet season and produced only poor crops. At Bata-ata, the maize and sorghum crops were well above average. Further experimental rotation trials were made at the Ambalantota Experiment Station and at Embilpitiya. At Ambalantota chillies and tomatos have proved to be satisfactory money crops whilst at Embilpitiya groundnuts are promising. At the former station chilli cultivation gave nett profits of Rs. 175.60 to Rs. 176 per acre and tomatos a nett profit of Rs. 70 per acre. Kurakkan crops after cotton have also been satisfactory, as also crops of tenai. The growth of dhall has been good but crops have been poor except on one station owing to damage from blister beetle (*Mylabris pustulata*). The crops on these stations for the season 1927-28 are well above the average in the neighbourhood and with the drier season the pulse crops, particularly green gram, cow peas, and kollu are most promising. The results at Embilpitiya have convinced the village cultivators as to the feasibility of continued cultivation on chena lands and leases have been granted to nine cultivators for lands which are to be cultivated on a system recommended by the Department. The evidence secured up to date points to satisfactory crops being possible if early cultivation is carried out and if weeds

are kept under control. It is hoped during the year to draw up a scheme for the consideration of Government for trial in the dry zone in the effort to secure a more permanent system of agriculture. Money crops are required in addition to the necessary food crops. Cotton offers fair prospects in some areas; trials have been made with kapok and all available seed of the Java type has been distributed; chillies are profitable, but an improvement in marketing facilities is required before any appreciable expansion in this crop is to be expected; tomatoes give good profits where easy transport to markets exists; whilst sisal has possibilities and is to be tried in two villages in the North-Central Province and the Hambantota District on a commercial scale. Groundnuts have given excellent crops in some localities, but they are damaged by pigs and require, for their satisfactory growth, a sandy loam fairly free from stones.

37. Work on the stations at Maho and at Dambulla commenced during the year. At Dambulla satisfactory crops of cotton, maize, sorghum, and kurakkan were growing at the end of the year, whilst at Maho, crops were rather late owing to a late sowing, but the cotton, green gram, and groundnut crops were promising.

WORK ON EXPERIMENT STATIONS.

38. At the Peradeniya Experiment Station work in connection with soil erosion has been continued. Plots A showed a loss of 6 tons of soil per acre and plots B a loss of 10.9 tons per annum per acre before the planting of cuttings was done. The testing of the effect of *Indigofera endecaphylla* in tea is being watched with interest. The preliminaries for tea manurial experiments were completed during the year, and initial plot yields for a whole pruning period have been secured. Tapping and manurial experiments with rubber have been continued and have been reported upon separately. Higher yields with less scrap have been secured from the plots tapped with V cuts than from plots tapped with the single cut to the left.

39. Trials with various fodder grasses have also been continued and a number of new grasses are under experiment. It has been decided to stop taking the yield records from these grasses from 1928, as the coconut varieties which have been interplanted in the grasses are beginning to interfere with their growth. The need for systematic manuring and cultivation if high yields of grass are to be maintained has been demonstrated in these trials.

40. The outstanding feature of the year's experiments has been the high yields of the robusta types of coffee. The following are the yields which have been secured in recent years:—

Pounds of Fresh Berries per Bush for the last Four Years.

	1924.	1925.	1926.	1927.	Average.
Robusta ..	2.37 ..	4.01 ..	3.23 ..	8.54 ..	4.54
Uganda ..	3.43 ..	5.29 ..	2.06 ..	8.99 ..	4.94
Quillou ..	6.91 ..	3.43 ..	3.91 ..	5.01 ..	4.81
Canephora ..	3.01 ..	3.88 ..	3.09 ..	10.29 ..	5.07
"Hybrid" ..	8.38 ..	5.62 ..	9.78 ..	7.61 ..	7.85

There has been an increasing demand for robusta types of seed for sowing and there has also been a strong demand from South India. The demand for seed for sowing during the year was as follows:—

	Lbs.
Ceylon orders ..	238
South Indian orders ..	255
Others ..	30
Total ..	523

41. A good deal of attention has been given to the budding of rubber and another area to test the influence of stock on scion has been planted out. A number of budded plants have also been supplied to the Rubber Research Scheme Experiment Station and to the minor experiment stations at Kegalla and Kuruwita. Further experience has been gained in budding and it has been found that satisfactory budding can be secured from green wood provided that the buds when put on are left covered with the budding tape for not less than three weeks after budding and that the buds are carefully shaded from the direct rays of the sun in order to prevent the curling of the bud-patch.

42. A number of experiments have been established on the Peradeniya Experiment Station in collaboration with the Agricultural Chemist to test the decomposition rates of green and organic manures.

43. Plots of *Taraktogenos kurzii* and of *Hydnocarpus wightiana* for the production of chaulmoogra oils have also been established.

44. At the Anuradhapura Experiment Station the extraction of sisal was hindered owing to the shortage of water. Work could only be carried out for a portion of the year. Similarly the paddy work was greatly interfered with on account of water shortage and all attempts at a maha crop had to be abandoned. The replanting of old sisal areas has been satisfactorily carried out at a cost approximating Rs. 100 per acre. The main difficulty is the disposal of the old root stocks, but these have been satisfactorily got rid of and replanting has been done so as to permit of intercultivation between the rows of sisal. Replanting of old limes has continued and the young plants appear to be thriving satisfactorily. With the dry year, there was a slight improvement in the condition of the lime cultivation. Rotation experiments have also been begun on an area which had been under Mauritius fibre for a number of years. Cotton, cereal, and pulse crops are being grown and growth was particularly satisfactory up to the end of the year. Some trials with hill paddies and with selected kurakkans have also been begun on this station.

45. At the Jaffna Experiment Station, work with White Burley tobacco has been continued. The crop grown without irrigation yielded 932 lb. per acre and was of better colour and quality than the irrigated crop. Manurial trials indicate that artificials, when employed, with burial of green leaf give the most satisfactory results at Jaffna. The selection work on chillies, tenai (*Setaria italica*), kurakkan (*Elusine coracana*) has been continued. Strain No. 12 and three other types of chillies have given very promising results, whilst the tenai selections have now reached the stage when they can be distributed to cultivators with confidence.

46. The tomato crops grown on the Jaffna Experiment Station have been very satisfactory. Crops have been heavy, the fruits have been large and of excellent quality and it has been demonstrated that transport to Colombo and Kandy is not too costly. The prospects before tomato cultivation in Jaffna are distinctly promising.

47. Similarly the profits from sugar-cane cultivation for jaggery manufacture are sufficient to warrant this cultivation being extended. It is a cultivation which could replace tobacco should anything happen to the tobacco industry.

48. Good results have been secured from plots of kolupatti grass (*Pennisetum cencrroides*). It has stood grazing well and promises to be an excellent pasture grass for the dry zone. Trials have this year also been made with this grass at the Bata-ata rotation station in the Hambantota District and its growth has been exceptionally good.

49. Specially selected date palms have been imported from Egypt and trials at the Jaffna, Mannar, and Anuradhapura Experiment Stations have been arranged.

50. A large crop of groundnuts was raised at the Experiment Station at Nalanda, and it is evident that the soil and climatic conditions in this area are favourable. Damage from wild pig was, however, considerable. Satisfactory crops of ground nuts have also been secured at the Bibile and Embilipitiya stations.

51. The Java type of kapok fruited at Nalanda station and the reports on the fibre have been satisfactory. The floss is not so long or of such high quality as the best floss grown in Java, but it is an improvement of the Ceylon ordinary product. All seed has been distributed, and in view of the fact that the market reports that it can take fully ten times the present quantity produced in Ceylon without difficulty there is every reason to encourage the cultivation of kapok on lands of low capital value and in those areas of the Colony where money crops are badly required by small holders.

52. The Bandaragama station was equipped during the year as a demonstration rubber station for the small grower. The type of smoke house recommended by the Rubber Research Scheme and adopted by the Department has been erected and a definite series of experiments drawn up. The following gentlemen have agreed to act as an advisory committee for the station:—Messrs. A. M. Clement Dias, A. E. Dias, D. H. W. Kannangara, and M. Walter Salgado.

53. At Batapola station good crops of pineapples have continued to be secured. There is a demand for suckers from this station and it has been shown that this cultivation is very profitable in this locality. At this station, the Kew pine cultivations have not produced fruit until the plants were two years old and in consequence experiments with different times of planting have been started.

54. At the Chilaw trial ground the coconut experiments have been continued, and Gate Mudaliyar A. E. Rajapakse and Mr. J. E. P. Rajapakse have continued their experimental areas.

55. Some two years ago a beginning was made with the establishment of nursery supply blocks in the Wewagam pattu of the Eastern Province. These have proved to be most successful and the plants distributed from them have been appreciated by the village cultivators. Three such blocks had been established at Mahaoya, Uhana, and Lahugala, but during the year another was opened at Tamana. From these stations the following plants were sold or distributed during the year:—2,700 jak, 1,906 lime, 150 orange, 1,250 papaw, 1,300 coconuts, 100 pomegranates, 1,000 manioc cuttings, 5,000 kapok seedlings. A similar station was opened in the Central Division at Kumbalgamuwa for the Walapane district. The distribution from this station amounted to:—1,000 coconut plants, 400 lime plants, 700 jak plants, 20 plantain plants, and a large number of vegetable seeds. The demand for coconut plants was greatly in excess of the supply.

56. At Tamana in the Wewagam pattu, the introduction of citronella has been satisfactory and steps have been taken for erecting a still for dealing with the crops raised. There are large areas of talawas in this pattu covered with a wild mana grass. If this could be replaced by good oil-yielding citronella grass a possible industry for the inhabitants of this backward district might be established. The Ratemahatmaya of this pattu is keenly interested in the introduction of money crops and is doing what he can to encourage their spread amongst the village inhabitants.

COTTON PURCHASE SCHEME.

57. The season was not a good one for cotton, as crop yields were reduced by the unseasonal rains during the early months of the year. Growth was exceedingly promising, but heavy boll and flower shedding occurred. The crop of the Hambantota District amounted to 1.907 cwt. of seed cotton and 97 cwt. were produced in other districts. There was a slump in prices and Government undertook, in order to maintain prices to pay a subsidy of Rs. 5.50 per cwt. of seed cotton.

58. The financial aspect of the 1926-27 season is shown in the following statement:—

Hambantota District Purchase Scheme, 1927.

	Rs.	c.
(1) Transporting cotton seed	304	18
(2) Boat hire and transporting cotton seed from Hambantota to Ambalantota	63	58
(3) Transporting seed from Ambalantota to centres	110	47
(4) Bagging and stocking cotton at centres	380	62
(5) Travelling of officers, police escort, and transporting cash box	1,335	29
(6) Needles, painting brushes, enamel, twine, &c.	48	49
(7) Printing cash book and receipt books	58	0
(8) Boat hire on transport of seed cotton	447	6
(9) Steamer freight	1,877	23
(10) Cart transport of seed cotton	2,114	1
(11) Transporting scales and weights	40	85
(12) Transporting gunny bags to different centres	186	48
(13) Bonus to headmen	953	50
	7,919	76
(14) Amount paid to cultivators	31,592	35
	39,512	11
Value of cotton—		
	Rs.	c.
No. 1 cwt. 1,852-3-13 at Rs. 15 per cwt.	27,793	0
No. 2 cwt. 54-2-13 at Rs. 10 per cwt.	546	16
	28,339	16
Subsidy at Rs. 5.50 per cwt. on above	10,491	15
	38,830	31
Deficit	—	681 80

59. The erection of buying stores at Bata-ata and Middeniya were of great assistance in the purchase of cotton and was appreciated by the growers. Growers were enabled thereby to secure cash for their crops at convenient centres and the direct purchase at other centres on definite dates was rendered less arduous to the divisional staff.

60. Special mass selection was carried out on the Ambalantota station and some special individual selection was done in the Cambodia and Durango varieties. The Durango type is attacked by Jassids in the Hambantota District, but one hairy plant of Durango was isolated and selected for future breeding work. Unfortunately, the seed from this plant failed to germinate and this search for a hairy Durango will have to be continued.

61. Interest in cotton in the Hambantota District continues, and the following acreage has been granted for cotton cultivation during the 1927-28 season:—

	Acres.
Magam pattu	293
East Giruwa pattu	1,290
West Giruwa pattu	5
	1,588

SUGAR.

62. The sugar-cane experiments has been continued at Bibile Experiment Station, at Jaffna Experiment Station, and at Allai. At the latter station some difficulties were at first experienced in the preparation of good jaggery. These difficulties were eventually overcome and a high grade jaggery was secured. The yields were very satisfactory at this station and a special report is under preparation. Samples of canes were regularly analyzed by the Agricultural Chemist and some good sucrose contents and purities were experienced when the canes were fully ripe. The growth of the ratoon canes has been fairly satisfactory, especially where drainage has been good. There has been some waterlogging of parts of the station and on these patches growth has been poor. The results secured to date indicate that sugar-cane cultivation could be profitably carried out around Allai if lands are properly drained. Yields of over 30 tons in the first crop and around 20 tons in ratoons may be expected, and the analyses of the juices are satisfactory when the canes reach maturity.

PINEAPPLES.

63. The issue of the leaflet giving details of the results of experiments with pineapples has stimulated inquiries in regard to this crop. Further experience has confirmed the value of light shade for pineapples in the drier portions of the Island, and it is to be hoped that eventually a cannery will be erected at or near Colombo. A regular demand for fruit from such a cannery would act as a stimulus to the cultivation of a crop, which is profitable and eminently suited to small holders.

PAPAINÉ.

64. The area under papaws for the preparation of papaine increased in certain districts during the year, but the slump in prices has recently rather damped enthusiasm over this crop. The Department issued during the year a leaflet dealing with the cultivation of papaws and with the preparation of papaine. There has been a keen demand for this leaflet. Steps have also been taken to make further tests with papaw cultivation at the Kegalla Experiment Station, and a small plant for the preparation of papaine will eventually be erected there for demonstration purposes.

FRUIT.

65. The demand for grape fruit plants has continued to be greater than the supply. It was decided during the year to extend the nursery work at Peradeniya in order that larger stocks of budded citrus plants would be made available. Special nurseries were laid down and a number of budded orange, mandarine, seedless lime, and grape fruit plants were raised. The demand, however, still exceeds the supply and is likely to until further stocks of bud-wood become available. It was decided during the year to stop the supply of seedling plants of citrus trees, and in consequence the numbers now available are dependent upon stocks of bud-wood. Private sources are being drawn upon and a number of named varieties of grape fruit, loquats, avocado pears, &c., were imported for the Experiment Station nurseries during the year from California and South Africa. Arrangements have also been made with a supplier of grafted mango plants from Jaffna from named trees. The Indian grafted mango plants have not fruited satisfactorily in Ceylon, and it has been thought desirable to distribute grafted plants from Jaffna and from the several experiment stations of the Department in the future. Orders are, however, still accepted for grafted plants from Australia and India, and during the year 83 applications were dealt with. One hundred and twenty budded grape fruit plants were imported from private parties during the year from Australia.

IMPLEMENTS.

66. Special draw-bar tests were made during the year by the Economic Botanist and the Manager of the Experiment Station with a number of implements. A full report on these tests has been published. The Department is now recommending the Ceres plough made by Messrs. Ransome Sims and Jeffries for ordinary cultivation work on dry lands with village cattle and the Victory plough by the same makers for work on dry lands which are light in character or when Indian bulls are employed as draught. For paddy fields the P. I. K. plough seems to be the best which has so far been tested. Representatives of implement manufacturers visited Ceylon during the year and have agreed with local agents to carry adequate stocks both of ploughs and of spares!

PRIZE-HOLDING COMPETITIONS.

67. There was an increase in the number of entries for competitions in the various parts of the Island, and especially in the Central Division where 31 competitions were held and 1,183 competitors entered. These increasing numbers indicate that the efforts of the Department are being rewarded, and that real benefit is being derived from these competitions. Generally an all-round improvement in the standard of work was noticeable. Greater attention was given to weeding and to systematic cultivation.

68. The following were the competitions held during the year, the total number reaching 114:—

Paddy cultivation.	School and home garden.
Paddy transplanting; weeding and ploughing.	Curry stuffs.
Vegetable garden.	Tobacco Cultivation.
Police garden.	Pineapple cultivation.

AGRICULTURAL SHOWS.

69. Agricultural shows were held during the year at the following centres:—Nuwara Eliya, Alawatagoda, Katugastota, Chavakachcheri, Mannar, Talawa (North-Central Province), Paragahakelle in Wewagam pattu, and Batticaloa. The standard of exhibits in the village shows showed improvement and their general arrangement was much better.

AGRICULTURAL EDUCATION.

70. Demonstrations and lectures in the vernaculars were given in the villages in regard to the control of pests and diseases, and the problems which are engaging the attention of the Department. Improved methods of the cultivation of paddy and foodstuffs have been stressed, whilst competitions held in all divisions stimulated a keener interest amongst the villagers.

71. The school curricula at the Farm Schools at Peradeniya and Jaffna were completely overhauled during the year and greater attention was given to practical work. The special Syllabus for Rural Science was drawn up and approved by the Education Department and the Board of Education. The teachers under training at the Peradeniya and Jaffna Farm Schools are being trained on this syllabus. A special Handbook for Teachers has been prepared and is now being published, while a Handbook on School Gardening has also been prepared during the year and is almost ready for the printers.

72. The Farm School at Peradeniya counted at the end of the year 25 students—7 second-year and 18 first-year in the English course. There were in addition under instruction 12 vernacular teachers who had passed through the Government Training College. These teachers are prepared in rural science and under training at Peradeniya have made satisfactory progress.

73. At the end of the year there were 9 students undergoing instruction in English at the Jaffna Farm School. In addition two other classes were formed, one for vernacular teachers numbering 13 and one headman, and the other for the training of farmers' sons. Besides the ordinary routine of the class room and the field all the students were afforded one week's instruction in the cultivation of paddy at the Paranthan Paddy Seed Farm. Two of the farmers' sons' course stayed over for further training in the teachers' class with a view to fitting them for appointment as teachers in estate schools.

74. The teachers go through the course of rural science prescribed and the value of school garden work is emphasized. In all divisions useful work has been carried on both in the class room and in the garden, and there is a distinct improvement in the knowledge acquired by the students of schools where agriculturally trained teachers are posted.

75. With a view to improving the teaching of nature knowledge and agriculture in vernacular schools, vernacular agricultural instructors (who had been teachers before) were given special training at the Farm School at Peradeniya, and appointed to four centres in the Central Division. These teachers each have eight schools to visit. In the case of one officer very satisfactory results have been secured and in the case of the other three fairly satisfactory progress has been reported.

76. The number of registered school gardens attached to both Government and grant-in-aid schools is as follows:—

Division.			Government.		Grant-in-Aid.
Eastern	..	..	60	..	32
Central	..	..	173	..	32
North-Western	..	..	118	..	7
Southern	..	..	186	..	4
Northern	..	..	86	..	5
South-Western	..	..	125	..	9

Unregistered gardens attached to Government schools are being registered as rapidly as funds permit. The number of such gardens fit for registration is yearly on the increase, and the difficulty in some cases is in obtaining funds from the Rural Education District Committees concerned for the supply of implements. A sum of Rs. 1,950 was allocated for the purpose from Government funds, and a total of 57 new gardens was taken on the list during the year.

77. Water supply and fencing are two essential requirements in many cases, and the attention of Education District Committees has been called to the necessity for improvement in this direction.

78. Worn-out implements have been replaced in all schools from departmental funds. A sum of Rs. 3,687.68 was spent on the replacement of implements during the financial year, and seeds and plants to the value of Rs. 2,350.38 was also supplied. These funds are, however, not sufficient for adequate upkeep and additional funds will be applied for during the next financial year.

79. The amount spent on school and home garden awards during the financial year 1926-27 was Rs. 4,098. 821 certificates were issued to teachers and pupils.

80. There is observed an all-round improvement in school garden work, the work of the Colombo and Ratnapura Districts being particularly good. The work in the North-Western Division continues to improve year by year—largely as the result of the number of competitions which have been organized in this division for prizes and cups generously provided by private donors.

81. The thanks of the Department are due to the following prize donors for the continued interest taken in these competitions:—The Maha Mudaliyar J. P. Obeyesekere; the Ceylon Spinning and Weaving Mills; Lieut.-Colonel T. Y. Wright; the Hon. Mr. G. S. Schneider; Dr. C. Brito-Babapulle; Mr. R. Sagarasingham, J.P.; Mudaliyar W. Daniel Fernando Waidyasekera of Panadure (under whose auspices prize competitions have been organized in four of the agricultural divisions of the Department); Mr. Chas. Chitty; Mudaliyar N. J. C. Wijesekera; and Messrs. E. S. A. Samaranayake, L. D. S. Gunasekera, E. J. Samarawickreme, K.C., and W. R. de Alwis Seneviratne.

82. Home garden work has improved in some districts, but considerable improvement can still be looked for in this direction.

SUB-DISTRICT AGRICULTURAL COMMITTEES.

83. The Central Division Agricultural Committees have been organized under unofficial chairmen for five separate korales with headquarters at Gampola, Hindagala, Kirinda, Pussellawa, and Katugastota. These Committees have dealt with many matters of importance to village agriculture and have been able to secure improvements in irrigation facilities and in other directions. The Divisional Agricultural Officer reports that the work of four of these Committees has resulted in several improvements and that thanks are due to the unofficial chairmen who have given their time to this work. This effort to organize small Committees for agricultural improvements is being encouraged as it seems to indicate a line of development which should have decided possibilities.

SEED DISTRIBUTION.

84. The demands for seeds has been maintained. The sales amounted to Rs. 15,334.43 and free distribution of a value of Rs. 3,974.17 was made. Care is taken to see that the germination capacity of all seed is good before it is issued and old seed of poor germination is regularly discarded. Some complaints regarding germination were received during the year, but every endeavour is made to ensure that only fresh seed is issued.

PESTS AND DISEASES.

85. Special separate reports are being issued dealing with the pests and diseases of plants during the year under review. It is therefore only necessary to allude to the principal matters of importance. The Mycological division received 543 consignments of diseased plants for investigation. This is an increase of 53 over the previous year. Special work has been done in connection with root diseases. The possible existence and nature of a mycological fungus or fungi in the smallest roots of tea has been found and further studies made on the pycnidial stage of *Rhizoctonia bataticola*. Paddy diseases have been under investigation by the Mycological division and the Plant Pest Inspector, Southern, and a sclerotial disease of paddy is being fully investigated. Further investigation into the bunchy top disease of plantains have been made. The disease in Ceylon appears to differ from the disease in Australia in certain respects and requires a close and detailed study both from the mycological and entomological standpoints. This work may necessitate considerable expenditure, especially in the erection of special isolation greenhouses and the Director of Kew has advised that in the first instance a full exchange of

data available up to date should be made with investigators in Australia. In Ceylon bunchy top stools of plantains have been found to have associated with them either singly or collectively the following:—

- Rhizoctonia bataticola*.
- Eel worm (*Heterodera radiculicola*).
- Aphis (*Pentalonia nigronervosa*).
- Root borer (*Cosmopolites sordidus*).
- Stem borer (*Odoiporus longicollis*).

It has yet to be ascertained whether in Ceylon this disease is a virus disease unassociated with root disease and whether the aphids alone can be the conveyor. The disease is generally reported by Agricultural Officers to be on the decrease, but the Plant Pest Inspector, Central, considers it still very serious in several parts of his division.

86. The Oidium disease of rubber has been under investigation, particularly the secondary form of attack. It is thought that manuring with nitrogenous manures will assist in checking the spread of this disease.

87. The Entomological division received 222 consignments of insect specimens during the year. Further investigations of the tea termite problem have been carried out and special facilities were granted to Mr. Jepson, the Assistant Entomologist, to visit America to confer with specialists on termites in that country. It is thought to be evident that *Calotermes dilatatus* (and possibly *C. militaris*) utilizes wounds through which to gain entry into bushes. It is therefore important that the pruning of tea—especially of young tea should be done carefully and that particular coverings for pruning cuts should be investigated and the effects of manures on callus formation studied. Trial plots have been laid down at Peradeniya to test the effects of manures on callus growth. It is not possible to make any statement in regard to these plots at present, but the growth of callus was most marked in the early stages of the experiment in the plot which received nitrate of soda.

88. The Tea Tortrix was declared a pest under the Plant Protection Ordinance during the year and scheduled controlled measures gazetted. The work in connection with these gazetted control measures has been entrusted to Mr. Jardine, the Plant Pest Inspector, Central, in whose division most of the tea occurs.

89. Pests of green manures have been the subject of detailed investigation by Dr. Hutson, the Entomologist, and further work has been done with the spotted locust and with the bean fly. The Assistant Entomologist continued his preliminary investigations on the eye fly until his departure on leave.

90. Reports of eel worms on various plants are being more frequently sent in by Plant Pest Inspectors. The coconut pests have been the subject of special attention in the North-Western Division and the parasites of the coconut caterpillar are the subject of investigation.

WATER HYACINTH ERADICATION.

91. A sum of Rs. 6,970.86 was spent on water hyacinth eradication during the year. Special attention was given to this weed in the Southern Province. In the Central Division the Plant Pest Inspector reports that it has been eradicated satisfactorily except in the Municipality of Kandy and the Local Board of Gampola. In the North-Western Division several areas have been cleared. The largest area dealt with was at Negombo, but a most satisfactory clearing of this area was effected. There are still some areas in this division which will require attention during the next year and special plans of work are being prepared by the Plant Pest Inspector. In the Southern Division the Kalutara District was free at the end of the year except for a few small areas around Bentota. The Ambalantota area had been dealt with and a fair amount of work done in the Tangalla area. The general public do not yet take a sufficient interest in this pest and land owners do not yet fully realize its seriousness. Areas which have been cleared by the Department have been allowed to become reinfested through prompt action not being taken when new seedlings were first observed. The general apathy will make the work of complete eradication more difficult, but progress up to date has been satisfactory and reflects great credit on the officers of the department entrusted with this work.

92. The new Fumigatorium at Colombo was completed during the year and it was taken over with effect from October 1. 754 consignments of plants comprising 7,452 packages were imported during the year and of these 295 consignments comprising 3,643 packages had to be fumigated. Twenty-six certificates of export for plants and seeds were issued during the year, including 14 certificates of fumigation.

CHEMICAL INVESTIGATIONS.

93. The Agricultural Chemist has carried out a number of analyses in connection with the soil erosion experiments, with sugar-cane experiments, and with fertilizer investigations. This division has also continued the special research work in connection with the accumulation of organic matter and nitrates in the cover crop plots of the tea area of the Experiment Station, Peradeniya, and with the nitrification of green manures. The chemical analyses of paddies have been carried out and investigations made into lime juice preservation. The results of this work as they have become available have been published in the *Tropical Agriculturist*. A study of the nitrogen content of soils under Vigna has also been begun.

CO-OPERATION.

94. The appointment of Mr. Campbell as Joint Registrar and an increase of the inspecting staff have made it possible for greater individual attention to be given to societies. Those with large areas have been cancelled, and liquidated or split up into societies with smaller areas. Ninety-six new societies were registered during the year and the registration of 65 was cancelled. The total number of societies at the end of the year was 354 with a total membership of 35,112, paid-up share capital Rs. 430,311.38, and with deposits of Rs. 67,689.23. Three Inspectors were

sent to Madras for training during the year and training classes for office-bearers were held at 8 centres during the year. The Divisional Agricultural Officers, North-Western and Northern, have given considerable attention to co-operation during the year and considerable improvement and expansion in their divisions have been shown. The whole question of the extension of the co-operative movement has been under the consideration of Government during the year.

PUBLICATIONS.

95. The following publications have been issued during the year:—

The "Tropical Agriculturist," Vols. LXVIII. and LXIX.

The "Govikam Sangarawa," Vol. XXI., Parts 7-12, and Vol. XXII., Parts 1-6.

The "Kamat Tholil Velakkam," Vol. XXI.

Bulletins of the Department of Agriculture.

No. 80.—Experiments in Cacao Fermentation.

No. 81.—Notes on the Cultivation of Sisal with special reference to Ceylon.

No. 82.—Field Experimentation with Rubber.

Leaflets.

No. 43.—Selection of High-Yielding Trees on Rubber Estates.

No. 44.—The Cultivation of Papaya and the Preparation of Papain.

No. 45.—Construction of Smokehouses for Small Rubber Estates (Sinhalese).

No. 46.—The Eri Silk or Castor Silk-worm.

No. 47.—Cotton Leaf Caterpillar.

No. 48.—Prickly Pear and Cochineal Insect (Tamil).

No. 49.—Tomato Cultivation.

No. 50.—Land Crabs in Paddy Fields.

96. The sales of publications realized Rs. 19,557.81 as against Rs. 20,227.38 during the previous year.

97. A complete revision of the form of the *Tropical Agriculturist* was made during the year. A larger number of original articles has been included and the results of investigations and experiments have been written up for this publication by officers of the Department as soon as the data became available. In this way, the agricultural public has been kept in close touch with the work of the Department throughout the year. The complete revision of the form of the vernacular magazines was also considered during the year and will be given effect to during 1928.

AGRICULTURAL CONFERENCE.

98. The Second Annual Agricultural Conference was held at Peradeniya on March 9, 10, and 11. There were five sessions, including a meeting of the Board of Agriculture, at each of which His Excellency Sir Hugh Clifford took the Chair, and evinced the greatest interest in every detail of the proceedings. At the final session, Sir Hugh Clifford introduced his paper on "Some Reflections on the Ceylon Land Question." The attendance was good, and many visitors took the opportunity to inspect the Experiment Station and the Laboratories at Peradeniya.

99. The following were the papers read and the discussions engaged in at the Conference:—

Estates Agriculture.

- (1) A Review of Recent Work on Root Diseases of Economic Crops, by Dr. W. Small, M.B.E., Mycologist, Department of Agriculture.
- (2) Some Diseases of Tea, by Dr. C. H. Gadd, Mycologist, Tea Research Institute.
- (3) Recent Work on Pests of Economic Crops, by Dr. J. C. Hutson, Entomologist, Department of Agriculture.
- (4) Tea Mites, by Mr. S. Stuart Light, Entomologist, Tea Research Institute.
- (5) Brown Bast of Rubber and its Treatment, by Mr. J. Mitchell, Organizing Secretary, Ceylon Rubber Research Scheme.
- (6) The Importance of Bark Examinations in the Selection of Prospective Mother Trees, by Mr. R. A. Taylor, Physiological Botanist, Ceylon Rubber Research Scheme.
- (7) A Discussion on the Manuring of Rubber opened, by Mr. H. W. Roy Bertrand.
- (8) Pests and Diseases of Coconuts in the North-Western Province, by Mr. C. N. E. J. de Mel, Plant Pest Inspector, North-Western Division.

General Agriculture.

- (1) Report on the Work on the Decomposition of Green and Organic Manures, by Mr. A. W. R. Joachim, Agricultural Chemist, Department of Agriculture.
- (2) Cover Crops and the Possibilities of Utilizing Indigenous Plants, by Mr. T. H. Holland, Manager, Experiment Station, Peradeniya.
- (3) The Mineral Constituents of Ceylon's Fodder Grass and the effect of deficiencies on Animal Growth, Nutrition, and Health.
 - (a) The Chemical Aspect, by Mr. A. W. R. Joachim, Agricultural Chemist, Department of Agriculture.
 - (b) The Influence of the Various Mineral Constituents on Animal Nutrition and the effects of deficiencies and evidence of such in Ceylon, by Mr. M. Crawford, Government Veterinary Department.

Village Agriculture.

- (1) Some Reflections on the Ceylon Land Question, by His Excellency His Hugh Clifford, G.C.M.G., G.B.E., Governor of Ceylon.
- (2) The Selection of Pure-line Strains of Paddy, by Mr. L. Lord, Economic Botanist, Department of Agriculture.

- (3) Reviews of some of the Divisional Work for the improvement of Village Agriculture, Messrs. G. Harbord, F. Burnett, G. E. J. Hulugalle, W. P. A. Cooke, Divisional Agricultural Officers.
- (4) The Work of Eradication of the Water Hyacinth, by Mr. W. C. Lester-Smith, Plant Pest Inspector, Southern.
- (5) The Introduction of Elementary Agriculture in the Vernacular Schools, by Mr. F. A. Stockdale, C.B.E., Director of Agriculture.

BOTANICAL INVESTIGATIONS.

100. Detailed reports of the Systematic Botanist and of the Curators of Botanic Gardens are attached. The Systematic Botanist has continued his work on the additional volume to Trimen's Flora and on the School Flora for the Kandy District. He has also made special investigations of the species of *Derris* found in Ceylon. 1,306 sheets were added to the Ceylon Herbarium, 386 to the Gardens Herbarium, and 698 sheets to the General Herbarium. Botanical specimens sent in for determination numbered 200.

101. Considerable changes have been made at the entrance of the Botanic Gardens at Peradeniya. New gates have been erected, the lodge moved. The entrance has been made thereby much safer to the motorist entering or leaving the Gardens and the general effect of the entrance to the Gardens has been appreciably improved. Improvements have also been effected to the nutmeg grove area and around the spice collection. The roads in the Gardens have begun to wear badly as the result of the increased motor traffic and a special vote has been secured for their partial improvement.

102. The improvements in Hakgala Gardens have been continued and the general condition of these Gardens is now satisfactory. Special attention has been given to an improvement of the propagating sheds. Many interesting plants in the Bulb garden have flowered throughout the year and the Rockery has been most attractive. It is hoped to establish eventually a better collection of Ceylon plants in the portion set aside for indigenous plants in this section of the garden and to establish a special Ceylon section in the fernery. The trials with fodder grasses in the patanas have not been successful. *Paspalum dilatatum* is the only grass or leguminous fodder plant which it has yet been found possible to establish at all satisfactorily.

103. Henaratgoda Gardens continue to improve and to be visited by an increasing number of visitors. The establishment of plots of *Taraktogenos kurzii* and of *Hydnocarpus wightiana* has been successful. The latter is growing faster than the former and seems to be more vigorous. A few vacancies still exist and it has been decided to fill these with other species of *Hydnocarpus* and to put out some grafted plants in order to ascertain if earlier fruiting can be induced thereby.

FURTHER EXTENSION OF THE WORK OF THE DEPARTMENT.

104. This question was carefully considered by a Sub-Committee of the Board of Agriculture during the year and its proposals were subsequently adopted by the Board of Agriculture. They have been considered by Government and have been generally accepted. Steps are also to be taken to make a beginning with the Coconut Research Scheme. A revised scheme has been prepared and will be ready for the consideration of the Legislative Council at an early date. These proposals for extension of the department will involve the opening of further Agricultural Stations and schools, and the situation of existing stations, gardens, and schools and of those proposed is shown in the agricultural map attached to this report.

EXPENDITURE.

105. The gross expenditure of the Department, including Clerical Service, stores, and stationery, during the financial year 1926-27 was as follows:—

	Rs.	c.		Rs.	c.
Salaries	437,181	19	Co-operative Societies:—		
Travelling	61,905	85	Salaries	34,659	59
General: Labour and Upkeep:—			Travelling	15,089	96
Peradeniya Gardens	22,646	23	Incidental expenses	471	80
Hakgala Gardens	7,002	93	Seed Store and Publication Depôt:—		
Henaratgoda Gardens	4,049	35	Salaries	9,027	0
Nuwara Eliya Gardens	1,792	61	Seed distribution	10,711	13
Queen's House Gardens	3,030	5	Publications	12,447	44
King's Pavilion Gardens	2,918	94	Incidental expenses	487	75
Queen's Cottage Gardens	5,832	20	Special Expenditure:—		
Temple Trees Gardens	1,052	18	Grants in aid for Agriculture Shows and		
The Lodge Gardens, Kandy	491	10	Competitions	6,145	0
The Lodge Gardens, Nuwara Eliya	1,433	78	Training of Secretaries for Co-operative		
Experiment Stations:—			Societies	1,974	70
Peradeniya	35,284	2	Experiments and demonstrations with		
Jaffna	11,257	61	paddy manuring and seed selection	30,479	92
Anuradhapura	19,657	17	Upkeep of additional minor experiment		
Chilaw Coconut Trial Ground	1,985	24	and demonstration plots	29,303	43
School and Home Gardens:—			Cotton experiments	35,282	26
Labour and upkeep	11,704	82	Maintenance of Davie's Tree, Katu-		
Upkeep of Library, &c.	8,940	73	gastota	246	0
Prevention of Plant Pests and Diseases	9,255	90	Sugar-cane experiments	3,711	82
Incidental expenses	11,370	56	Grant in aid to Imperial Bureau of Entomology	7,500	0
Agricultural Education:—			Imperial Bureau of Mycology	9,000	0
Salaries	14,614	82	Expenditure in connection with Rubber		
Lecturing fees	1,734	50	Research Scheme	67,500	0
Incidental expenses	5,139	68	Trials with fodder grasses on patanas	499	84
Labour and upkeep	5,610	10	Establishment of cattle breeding herd at		
Dieting of students	7,322	6	Experiment Station, Peradeniya	7,415	2
Dairy establishment	8,945	29			
Cultivation Chaulmoogra plan	1,024	6			
Central Experiment Station and Agricultural School for the Southern Division	44	0			
				986,630	74

106. This expenditure may be itemized under the following sub-heads:—

	Rs.	c.
Administration	99,906	22
Research : Scientific investigations, including Central Experiment Station	348,187	95
Botanic Gardens, including gardens of Governor's and Colonial Secretary's residences	92,117	86
Agricultural Education, including School of Tropical Agriculture, Farm School, Jaffna, School Gardens, Grants to Shows and Competitions ..	62,667	38
Divisional Experiments, including experimental cultivation of cotton and Experiment Stations in Jaffna and Anuradhapura, and other experimental plots	298,881	96
Co-operative Societies	52,196	5
Seed Store and Publication Depôt	32,673	32
	986,630	74

RECEIPTS.

107. The following is a statement of receipts for the financial year 1926-27:—

	Rs.	c.
(1) Sale of seeds and publications	34,969	34
(2) Botanic Gardens, Peradeniya	3,998	62
(3) Botanic Gardens, Hakgala	1,329	88
(4) Botanic Gardens, Henaratgoda	4,898	60
(5) Botanic Gardens, Nuwara Eliya	—	—
(6) Experiment Station, Peradeniya	36,413	28
(7) Experiment Station, Balangoda	61	20
(8) Experiment Station, Godakawela	324	29
(9) Experiment Station, Bibile	287	48
(10) Experiment Station, Veyangoda	184	80
(11) Experiment Station, Kuruwita	6	68
(12) Experiment Station, Batugedera	190	20
(13) Experiment Station, Embilipitiya	4	25
(14) Northern Agricultural Division :—	Rs.	c.
Experiment Station, Jaffna	1,036	38
Experiment Station, Anuradhapura	5,142	89
Experiment Station, Trincomalee	255	58
Experiment Station, Mannar	307	50
Experiment Station, Vavuniya	293	27
Experiment Station, Kilinochi	619	17
Experiment Station, Allai	103	17
Farm School, Jaffna	2,317	17
White Burley Tobacco Experiments, Jaffna	1,059	85
White Burley Tobacco Experiments, Cultivators	239	15
	11,374	13
(15) Central Agricultural Division :—	Rs.	c.
Experiment Stations	481	85
Farm School, Peradeniya	11,341	29
	11,823	14
(16) Southern Agricultural Division	2,042	81
(17) North-Western Agricultural Division	429	39
(18) Eastern Agricultural Division	407	0
(19) Economic Botanist Division	427	37
	109,172	46

108. These receipts may be itemized under the following heads and sub-heads:—

	Rs.	c.		Rs.	c.
(0) Head 3, Fines and Forfeitures	211	25	Head 8, Sundries	271	60
Head 4, School Fees	10,689	13	Head 9, Miscellaneous Land Revenue	74,868	64
Head 4 Sundries	22,136	13		109,172	46
Head 5, Post and Telegraph	9	10			
Head 6 Railway Receipts	9	65			
Head 8 Sale of Old Stores, &c.	976	96			

PRESS COMMUNIQUE.

109. The following *communiqués* were issued to the Press during the year:—

Agricultural Conference, 1927.
 Empire Marketing Board : A Fruit Intelligence Service.
 Empire Marketing Board : Fruit Intelligence Notes.
 Water Hyacinth and its Confusion with Certain Indigenous Plants.
 Prohibition of Importation of American Cotton into Ceylon.
 Chilli Cultivation Competition, Walapane Division.
 Vegetable Garden Competition, Matale South.
 Vegetable Garden Competition, Matale East.
 Curry Stuffs Cultivation Competition, Uda Dumbara.
 Competition for Green Manuring of Paddy.
 Vegetable Growing Competition, Valikamam West.
 Hiripitiya Co-operative Society Tobacco Growing Competition.
 Nikaweratiya Co-operative Society Paddy Growing Competition.
 Chilaw Vegetable Garden Competition.
 Wataraka Co-operative Society Curry Stuffs Cultivation Competition.
 Bogamuwa Paddy Cultivation Competition.
 Mudaliyar Wijesekera Competition for School Garden.

BOARD OF AGRICULTURE.

110. The Board of Agriculture met once, on March 10, 1927, and the meeting was also the morning session of the Agricultural Conference. His Excellency the Governor presided. The business consisted of the election of the Executive, Estates Products and Food Products Committees, as per list below, for the three years ending December, 1930, adoption of the report of the Special Committee on the further extension of the work of the Agricultural Department, and consideration of a Circular Despatch from the Secretary of State on the marketing and preparing for market of fruit in the oversea parts of the Empire.

Executive Committee.

His Excellency the Governor, President.	The Honourable the Member for the European Rural Electorate.
The Hon. the Colonial Secretary, Vice-President.	The Hon. Mr. A. Mahadeva.
The Hon. the Controller of Revenue.	The Chairman, Planters' Association of Ceylon.
The Director of Agriculture.	The Chairman, Low-country Products Association.
The Hon. Sir H. Marcus Fernando.	Mr. W. Coombe.
The Hon. Mr. D. S. Senanayake.	Mr. C. E. A. Dias.
The Hon. Sir James Peiris.	
Mr. R. G. Coombe.	

Ex Officio Members.

The Government Agent, Western Province.	The Government Agent, Northern Province.
The Government Agent, Central Province.	The Government Agent, North-Western Province.
The Government Agent, Southern Province.	The Director of Irrigation.

Mr. J. I. Gnanamuttu (Secretary).

Estates Products Committee.

The Director of Agriculture, Chairman.	Mr. W. H. Fitzpatrick.
Sir S. D. Bandaranaike, K.C.M.G.	Mr. R. P. Gaddum.
Mr. H. W. Roy Bertrand.	Mr. H. D. Garrick.
Mr. E. Maberly Byrde.	The Government Veterinary Surgeon.
Mr. D. S. Cameron.	Mr. H. V. Hill.
Mr. I. L. Cameron.	Mr. J. Horsfall.
The Chairman, Low-country Products Association.	Mr. Hew Kennedy.
The Agricultural Chemist.	The Hon. Mr. A. Mahadeva.
Mr. J. B. Coles.	The Manager, Experiment Station, Peradeniya.
Mr. Allen Coombe.	The Mycologist.
Mr. R. G. Coombe.	Mr. T. B. Panabokke.
Mr. W. Coombe.	Mr. G. Pandittasekera.
Mr. H. L. de Mel, C.B.E.	Mr. S. Pararajasingham.
Mr. Wace de Niese.	Mr. J. S. Patterson.
Mr. Chas. A. M. de Silva.	The Hon. Sir James Peiris.
The Hon. Mr. W. A. de Silva.	Mr. Gordon Pyper.
Mr. J. E. P. Rajapakse.	Mr. A. E. Rajapakse, Gatè Mudaliyar.
Mr. C. E. A. Dias.	Mr. J. W. Scott.
Mr. J. D. Dunlop.	The Secretary, Rubber Research Scheme.
Mr. C. C. Du Pre Moore.	The Hon. Mr. D. S. Senanayake.
The Entomologist.	Mr. N. D. S. Silva.
The Honourable the Member for the European Rural Electorate.	Mr. A. T. Sydney Smith.
The Hon. Sir H. M. Fernando.	Mr. J. H. Titterington.
	Mr. G. O. Trevaldwyr.
	Mr. E. C. Villiers.

Mr. T. H. Holland (Secretary).

Food Products Committee.

The Director of Agriculture, Chairman.	Mr. G. A. Gunatilleke, Kachcheri Mudaliyar.
Mr. W. A. Amerasekera, Kachcheri Mudaliyar.	Mr. C. B. Herat, Kachcheri Mudaliyar.
Mr. J. H. Armitage.	Mr. Harry Jayawardene, Gate Mudaliyar.
Mr. C. W. Bibile, Ratemahatmaya.	The Hon. Mr. A. Mahadeva.
Mr. J. A. M. Bond.	The Hon. Mr. T. B. L. Moonemale.
Mr. H. L. de Mel, C.B.E.	Mr. Candapper Muttiah, J.P.
Mr. Wace de Niese.	Mr. S. Muttuthamby, District Adigar.
Mr. C. A. M. de Silva.	The Hon. Mr. F. A. Obeyesekere.
The Hon. Mr. W. A. de Silva.	Mr. T. B. Panabokke.
Mr. J. E. P. Rajapakse.	Mr. S. Pararajasingham.
Mr. C. E. A. Dias.	Mr. Edmund Peiris, Mudaliyar.
The Divisional Agricultural Officer, Central.	The Hon. Sir James Peiris.
The Divisional Agricultural Officer, Southern.	Mr. A. E. Rajapakse, Gate Mudaliyar.
The Divisional Agricultural Officer, Northern.	Mr. S. Ramalingam, Kachcheri Mudaliyar.
The Divisional Agricultural Officer, North-Western.	Mr. W. A. Samarasinghe, Atapattu Mudaliyar.
Mr. C. Drieberg.	Mr. P. Saravanamuttu, Assistant Government Agent.
The Economic Botanist.	The Hon. Mr. D. S. Senanayake.
The Honourable the Member for the European Rural Electorate.	The Hon. Mr. M. M. Subramaniam.
The Hon. Sir H. M. Fernando.	Mr. T. Walloppillai.
The Government Veterinary Surgeon.	Mr. A. A. Wickramasinghe.

Mr. N. Wickramaratne, Mudaliyar (Secretary).

111. The following appointments were made to the Board of Agriculture during the year:—

Estates Products Committee.

Mr. R. Copland *vice* Mr. C. C. Du Pre Moore.
The Hon. Mr. W. A. de Silva *vice* Dr. C. Hewavitarne.
Mr. J. E. P. Rajapakse *vice* Mr. G. Robert de Zoysa.
Mr. L. A. Wright *vice* Mr. H. W. Roy Bertrand.
Mr. W. Y. Mackintosh *vice* Mr. J. H. Titterington.
Mr. B. M. Selwyn *vice* Mr. J. D. Dunlop.

Food Products Committee.

The Hon. Mr. W. A. de Silva *vice* Dr. C. A. Hewavitarne.
Mr. W. R. Jacks *vice* Mr. J. A. M. Bond.
Mr. J. E. P. Rajapakse *vice* Mr. G. Robert de Zoysa.
Mr. M. G. Perera *vice* Mr. A. A. Wickramasinghe.

112. The Estate Products Committee met on four occasions, namely, on May 12, July 5, September 13, and November 8 and dealt with the following matters:—

Progress Reports of the Experiment Station, Peradeniya.
Results of Rubber Manurial Experiments.
Effects of Change Over Tapping on Bark Renewal.
The Treatment of Bark Diseases in Rubber.
Results of Budding from No. 2 Tree, Henaratgoda.
Report on the Examination of the Bark of No. 2 Tree, Henaratgoda.
Research Work on Coconuts and Cinnamon.
The Treatment of *Indigofera endecaphylla* in the Experiment Station, Peradeniya, Tea Plots.
Travelling Expenses of Members.
The Handling of Young Tea.
Provision from Rubber Restriction Funds for Research Work.
Rubber Tapping Experiments at Peradeniya.
Consideration of the Report of the Sub-Committee of the Board of Agriculture *re* the Proposed Coconut Research Scheme.
Tea Manurial Experiments.
Declaration of Tea Tortrix as a Pest under the Plant Protection Ordinance.
Shot-hole Borer Infestations of Tea Seed.
Coconut Caterpillar and its Parasitic Control.
Budding of Rubber.
Fodder Grass Trials on the Experiment Station, Peradeniya, 1926-27.
Cacao Manurial Experiments.
Reduction in the Exports of Copra.
Tea Termites.
Sales of Rubber Seed.

113. The Food Products Committee did not meet during the year.

STAFF CHANGES AND DEPARTMENTAL EXAMINATIONS.

114. The following officers passed the Departmental Examination held in January and July, and the quarterly vernacular examinations during the year:—

Senior Departmental.—Mr. D. A. W. Ranasinghe (Field).

Junior Departmental.—Messrs. L. A. A. Perera, G. E. Punchi Banda, and D. W. K. Goonewardene (Field); Messrs. N. Thambiah, H. C. Peiris, P. B. Kapuwatte, W. F. Seneviratne, A. B. Attygalle, and T. V. Thamotheram (Agricultural and Research Branches).

Probationers.—Messrs. A. W. Kannangara and S. Sangarapillai.

Sinhalese.—Messrs. R. N. Sinniah, T. J. Jayaratnam, A. W. Kannangara, T. Young, W. P. de Silva, D. W. K. Goonewardene, G. E. Punchi Banda, R. Siriwardene, C. B. Kumarasinghe, E. de Alwis, D. G. Pandittasekera, St. L. H. de Zylva, W. B. Mahagedera, S. Kandiah, and R. S. D. Jansz.

Tamil.—Messrs. P. A. Gooneratne, T. Young, W. P. de Silva, D. W. K. Goonewardene, G. E. Punchi Banda, L. Lord, M. P. D. Pinto, R. Siriwardene, and W. F. Seneviratne.

115. The following changes took place during the year:—

Messrs. N. K. Jardine and M. Park returned from leave, and assumed duties on February 2 and March 8 respectively. Mr. F. P. Jepson, Assistant Entomologist, left for England on July 7. His work is attended to by the Entomologist and the assistants. Mr. G. Harbord, Divisional Agricultural Officer, Southern, left for England on November 24, Mr. W. C. Lester-Smith, Plant Pest Inspector, Southern, acting. Mr. W. R. C. Paul, B.A., M.Sc., A.R.C.S., was appointed to act for Mr. W. C. Lester-Smith as Plant Pest Inspector, Southern.

116. The following appointments took place during the year in the Clerical, Agricultural, Research, and Field Staffs of the Department:—

Clerical.—Messrs. H. C. Wijeratne and W. B. Galagoda as Clerks, Co-operative Societies, the latter in place of Mr. C. Hulangamuwa resigned. Mr. M. V. H. Silva as Clerk to Divisional Agricultural Officer, Central, *vice* Mr. T. B. Bulumulla, promoted as Inspector of Co-operative Societies. Mr. E. A. Wijayaweera as Clerk to the Plant Pest Inspector, Central, and Mr. D. B. Suriyadasa as Clerk to the Divisional Agricultural Officer, North-Western.

Bookbinder.—T. Rajendram.

Agricultural.—Messrs. St. L. H. de Zylva and S. C. Gunaratnam as Headmasters of the Farm Schools at Peradeniya and Jaffna respectively.

Mr. N. Rasiah as Assistant Farm School Officer, Jaffna.

Mr. W. B. Mahagedera as Agricultural Instructor, Bibile.

Messrs. T. B. Bulumulla, A. C. A. Dassanaiké, R. C. S. Cooke, A. Aluwihare, H. L. B. Ellegala, and M. Manickam were appointed to fill the six new posts of Inspectors of Co-operative Societies.

Messrs. W. A. Singapully and J. E. Seneviratne were appointed probationers.

Research.—Mr. M. S. Wickramaratne as Assistant in Economic Botany.

Field.—Mr. P. B. Keppitipola as Assistant Foreman, Experiment Station, Peradeniya. Messrs. V. Kanapathipillai, A. H. Siyambalagastenne, and L. C. Gunatunge to be Conductors.

117. The following transfers took place during the year in the Clerical, Agricultural, Research, and Field Staffs of the Department:—

Clerical.—Mr. J. B. Imbuldeniya, Clerk, Badulla Kachcheri, transferred to Head Office. Mr. S. M. Abeyaratne, Clerk, Education Department, *vice* Mr. G. M. Direckze transferred to the Excise Department. Mr. C. L. de S. Wijesundere, Clerk, Fiscal's Office, Galle, and Mr. P. B. Dabere, Clerk, Police Department, transferred to this Department to fill two new posts. Mr. H. M. Rasnayake, Clerk to the Divisional Agricultural Officer, North-Western, transferred to the Police Court, Puttalam.

Agricultural.—Mr. V. Canagaratnam, Farm School Officer, Jaffna, to the Southern Division as Agricultural Instructor. Mr. N. Thambiah, Agricultural Instructor, Iranamadu to Jaffna, as Assistant Farm School Officer. Mr. J. A. Rambukpota, Agricultural Instructor, Bibile, as Senior Agricultural Instructor, Badulla, in place of Mr. E. W. Dias Bandaranayake transferred to the Central Division. Mr. A. Abeysinghe, Agricultural Instructor, Rattota to Dambulla.

Research.—Mr. B. A. Pereira, Sub-Inspector of Plant Pests, from Galle to Tangalla *vice* Mr. Joubert de Zylva to Galle.

CONCLUSION.

118. In conclusion I desire again to place on record my appreciation of the manner in which all officers of the Department have discharged their duties. The demands on the Department from the public continue to increase, and it is not always possible to meet to the full all the demands for information and for plant supplies from experiment stations. All officers are, I am convinced, endeavouring to give of their best for the furtherance of the agricultural industries of the Island, and any instances of slackness have been promptly dealt with.

Peradeniya, April 14, 1928.

F. A. STOCKDALE,
Director of Agriculture.

ANNEXURES.

I.—ANNUAL REPORT OF THE DIVISION OF SYSTEMATIC BOTANY FOR 1927.

BOTANICAL specimens sent in for determination numbered 200. 126 specimens were sent to Kew for determination, 16 specimens to Calcutta and some to the Arnold Arboretum. A collection of 207 grasses was sent to the Smithsonian Institution. Diatom material was sent to Harbin (China). A collection of 134 specimens of Ceylon trees and shrubs and 3 preserved flower specimens were sent to the Imperial Forestry Institute, Oxford, making a total of 137 specimens sent to that Institute. Eighty-seven packets of seeds and fruits were sent to Kew. Pickled flowers of *Sterculia* were sent to Miss E. R. Saunders, Newnham College, Cambridge, England. Seeds of *M. paradisica* (wild) were sent to Honolulu, Hawaii. Twelve different varieties of latex plants were collected and sent to Michelin & Co., Colombo. Nineteen specimens of anomalous stems in spirit were sent to the Oxford Department of Botany. Sixty-five herbarium specimens were sent to the National Herbarium of Victoria in exchange for specimens received. Three specimens of *Selaginella* were sent to Birbeck College, London.

Sixty-five herbarium specimens from the National Herbarium of Victoria, Australia, 80 specimens from the Imperial Forestry Institute, Oxford, and a specimen of *Hydnocarpus anthemintica* from the Director of the Botany Section, Bangkok, were received.

Visits were made by the staff to the following places:—Kurunegala, Nalanda, Nuwara Eliya, Kuruwita, Kalugammana, Hunasgiriya, Hakgala, Kadugannawa, Anuradhapura, Mullaitivu, Mankulam, Dambulla, Arugam Bay, Pottuvil, Panama, Alutnuwara, Gampaha, Gurugama, Rangala, Kitulgala, Haputale, Haragama, Hanguranketiya, Galle, Uma-oya district, and Adam's Peak. The Systematic Botanist went to Tangalla to witness in connection with a case of illicit felling of Crown timber.

The species of *Derris*, found in the dry zone, were studied in company with Mr. Baxter, the following species were found:—

- (1) *D. benthami* called Karapu-tekel, T. at Trincomalee; Karun-koddi, T. at Kantelai Miung-kala-vel, S. at Habarane and Kalu-kala-vel or Hung-kala-vel at Uma-oya. The bark of the roots of this species is commonly used as a fish poison.

The other species are rarely if ever used in Ceylon—

- (2) *D. scandens* called Welan-tekel, T. at Trincomalee, and Bu-kala-vel, S. at Habarane.
- (3) *D. parviflora* called Honda-kala-vel, S. at Habarane, and Sudu-kala-vel or Diya-kala-vel at Uma-oya.
- (4) *D. uliginosa* called Til-ankoddi, T. at Trincomalee. Trimen states that this is the species used as a fish poison.

Cuttings of these species were sent to Mr. Baxter to the Gardens and to the Experiment Station, Anuradhapura.

The wild plant known as *Hydnocarpus alpina* was found not to be that species, which is a source of chaulmoogra oil.

A list of 114 Ceylon plants used as fish poison has been made.

106 drawings were completed by the draughtsman, 61 being for the projected School Flora of the Kandy District.* Of the latter 31 were by Mr. A. G. Alwis of the Mycological Division.

1,306 sheets were added to the Ceylon herbarium, 886 to the gardens herbarium, and 698 sheets to the general herbarium.

HAKGALA HERBARIUM.

The Hakgala herbarium was inspected in February, 1927.

MUSEUM.

Twenty large show cases were painted and the exhibits rearranged, 975 new labels were affixed. Ten varieties of seeds were added. Thirty-five old specimens and 12 old medicinal seeds were replaced with new ones. 120 wood specimens, 2 almirahs, 2 satin wood screens, 55 picture frame, 12 hanging frames, and 24 windows were well polished.

One and a half pounds sample of sugar manufactured on Mr. Winter's estate, Pillagoda valley, 1 pine apple from Dr. J. C. Hutson, 3 small bazaar bags and a piece of mattress made of screw pine leaves from Mr. Isaac of Monerakande estate, Koslande, bundles of White Burley tobacco from Jaffna, Dambara, Mahabintenne, and Hirigala, 1 light cigar made in Burma, a specimen of smoked rubber sheet from Java and freak coconuts presented by Mr. Kumarasinghe of Nattiyandia and Mr. Kariappar, Vanniah of Pan pattu, Batticaloa, were received and are being exhibited. Two medals presented at an Agricultural Show held in Kandy in 1887 were purchased from the Taza stores.

A. H. G. ALSTON,
Systematic Botanist.

Peradeniya, January 12, 1928.

II.—ANNUAL REPORT OF THE ROYAL BOTANIC GARDENS, PERADENIYA, FOR 1927.

THE year under review has shown steady and consistent improvement in the gardens and although regular attendance of the labour has been difficult to maintain, all routine work has been kept well in hand. The collections in the Arboretum, the Pinetum, and the Palmetum have received regular attention, and additions made, whilst the general appearance of the lawns, beds, and borders has been improved. The roads and paths throughout the gardens are receiving special attention.

ARBORETUM.

The Arboretum has now been sufficiently thinned of all superfluous growth, the removal of which has been steadily in progress for several years, to allow each order of the systematic planting here to be defined.

New plantings continue to be made annually as new plants are successfully raised and this year's additions include the following among others:—*Anona diversifolia* Safford the "Ilama," a new species latterly collected from Mexico and reported to be a valuable fruit resembling the Cherimoya and of a flavour similar, but superior to the custard apple; *Boschia Mansoni* Gamble, a type of Durian of Burma; and *Cassia moschata* H. B. and K., a beautiful flowering tree of South America. This species was originally introduced about 1890, and one full-grown specimen is represented here and flowers freely each February, but does not produce seed. Others include *Bauhinia Blakeana* Dunn, a fine flowering small tree, received from Hong Kong; *Xylia dolabrifomis* Benth, the iron wood tree of Burma and Malaya, and an excellent timber; *Bassia Holtrungii* K. Schum., a tree of New Guinea, which attains 40-50 feet in height, and bears fruits often one pound in weight which are eaten and are common to the local markets there; *Grevillea Hilliana* F. Muell., a handsome flowering tree of Australia; and *Baccaurea racemosa* Muell. Arg., a Euphorbiaceous tree of Java, reputed to be a useful fruit tree.

Iron signboards, glazed, and enamelled denoting the name of the order were made to order at the Government Factory and each order in the Arboretum is thus indicated. Sectional maps on a large scale of roughly 10 yards to the inch are in course of preparation and the position of each tree in the section is accurately indicated on the map. This in conjunction with the card index system in progress in the office will result in an accurate record of all particulars of the trees in the sections in a short time and later on of the whole garden contents.

PALMETUM.

New plantings continue to be made here and the area available of certain groups has become restricted. On completion of the present alterations to the old Talipot avenue site, however, certain depressions are being filled in and the levelled area will be utilized for later extensions of the congested groups.

Among the more interesting palms planted out this year are the following:—*Erythra armata* S. Wats., *Chamaerops humilis* L. var. *tomentosa*, and var. *hystrix*, *Washingtonia Sonorae* S. Wats., *Coelococcus carolinensis* Engl., and *Corypha elata* Roxb.

With the flowering and fruiting of the last of the Talipots in the South Garden avenue steps were taken to remove all stumps and level up the area, previously of very irregular surface, by cutting away the east side section and filling in the west, or lower section. The road was lowered 2 feet to allow sufficient soil for the purpose and the levelling has been completed, the sections right and left of the road now being uniformly level. A double row of beds has been prepared at 30 feet apart and seed of the Talipot sown *in situ* thus forming a new avenue to replace the old.

PINETUM.

No further plantings have been made here, nor have any casualties occurred. The conifers here continue to make good progress and many specimens are now of sufficient size to render this portion of the gardens attractive. Young plants of new species raised from seed this year should be available for planting next season.

* Some of these require the addition of dissections of the flowers.

FLORICULTURE.

The flower garden portion of the gardens has been considerably improved within the past few years and the ornamental features and additional colour obtained from the new pergola of climbers referred to last year and the additional long border made this year adds greatly to the decorative aspect of this section.

The removal of the roses from the rose garden to the new border referred to has resulted in much more satisfactory growth and free flowering. The conclusions drawn from past experience are that the present rose garden site is not sufficiently drained for the successful culture of roses, and all the beds here have in consequence been thoroughly trenched and one foot of brick rubble to form drainage, put in at the bottom of the beds. The soil is normally very retentive to moisture and should now, with just the necessary amount of drainage, suit roses much better.

ROADS AND PATHS.

All roads and paths have received attention during the year, but the lack of metal and shortage of gravel prevented such being made or re-made in as thorough a manner as would be desired. With the advent of the new financial year however a substantial vote was sanctioned towards the thorough overhaul and re-metalling of a portion of the garden roads.

The lining of the road edges with brick, pointed with cement, continues, the palm group in the Great Circle, the Monument road and the Lake drive having been completed during the year. The latter drive has been straightened out to some extent, the lining with brick allows of suitable drainage in itself, and all unsightly earth side drains are being filled in as the lining proceeds.

NEW IMPROVEMENTS.

The large scheme of alterations to the gardens frontage has been completed. The old entrance lodge was pulled down and re-erected on the entrance side to left of main gates. The gate pillars were dismantled and re-erected on alignment with the Main Central drive, with the addition of wrought iron flanges of similar design to the gates, in lieu of the former brick wall flanges, the whole presenting a more substantial and improved appearance than hitherto. The two approach roads to the gardens entrance have been thrown well back and considerably widened thus facilitating a more safe and more spacious entrance and exit to the gardens. Suitable cement coping stone has been formed along the road edges extending around the edges of the outside triangle and right and left of the entrance on gardens side, for a considerable distance. The area immediately inside the gates has been levelled and turfed, and two new beds formed right and left of entrance gates.

The old Madras thorn hedge from gates to subordinate staff quarters bordering the main road has been taken up, the wire fence repaired and re-erected on uniform lines and levelled, trenches thoroughly manured and prepared and a new hedge of Madras thorn seed sown *in situ*.

A new long border for herbaceous perennials has been formed along the whole length of the flower garden on the east side. The border is 15 feet wide and well over 550 feet long and was well trenched and manured and planted up with the more showy perennials, including ten dozen new rose plants received in July from Australia. This addition has already greatly improved the attractiveness of this section of the gardens.

An improvement of considerable advantage has been carried out in the opening up, levelling, and laying out of the portion comprising the nutmeg grove with part of the Liana drive borders in the vicinity of the newly erected latrines.

A new path, 6 feet in width, leading from top of Main drive through to the flower garden, with branch paths leading to Liana drive have been traced out and made and a large amount of soil was needed to bring this area to a uniform level, such being obtained from the soil excavated in the sloping and levelling of the frontage area at South Garden, and by reducing the small hillock at great circle in section F., to left of Thwaite's memorial. The new 6 feet path was well metalled and tarred, the sides being lined with brick and pointed with cement, whilst groups of cane palms have been planted bordering the path at suitable distances, for ornamental effect. The two existing paths through the section running in parallel lines have similarly been dealt with as regards metalling and lining with brick, and the tarring of these will be undertaken with the next dry weather.

A cross path to link up the three long paths is being formed whilst the main road leading to the Curator's office has been deviated to bring in line with the new area now opened up. The drainage system throughout the section has been improved and a small mound for ferns erected at junction of the cross paths with the main road at flower garden. The carpenter's shed which hampers the completion of the improvements here is now in course of re-erection elsewhere, whilst sites for the erection of new plant and propagating sheds have been laid out on uniform lines near the present glass house.

PROPAGATION.

Many new and useful additions have been made to the new fruit garden behind Palmyra drive, and many grafted fruit trees were put out with the arrival of the south-west monsoon, and include the following received chiefly from the United States Department of Agriculture, Washington, and from Trinidad:—

<i>Loquats.</i>	<i>Grape Fruit.</i>	<i>Avocado Pear.</i>
Pineapple	Duncan	Wilder
Early Red	Mac Carthy	Gottfried
Advance	Triumph	E. L. Fuerte
Thales	Mareh's Seedless	Rivers
	Connors Prolific	St. Anns'
	Walters	Pollock
	Pernabuco	Guatemala
	Foster	

In addition three plants of tengelo (a cross between a tangerine and grape fruit) and a hybrid strawberry guava were received from Washington. These plants have been introduced in order to provide budding material for budding operations now in progress in the nurseries.

A commencement has been made on the budding of the more choice fruits principally grape fruit, orange, mandarine, and lime. On the overhaul of the economic nursery mentioned in last report bed space for raising stocks in bulk was arranged and large stocks of Pomelo and Seville orange for stock have, and are being raised. Budding as far as suitable sized stocks permitted commenced early in the year, the first batches of budded fruits being rapidly disposed of. Later buddings are coming along well but it is found that both the seedling stock and later, the scion, after budding make very slow growth, as on present experience the Citrus stocks do not permit of budding under eighteen months of age, and this only with good manuring.

Choice of stock most suited for conditions at Peradeniya is limited; and Seville orange and Pomelo appear the best.

Approximately 5,000 stocks for budding are being raised some 150 having been successfully budded and disposed of, 650 budded and growing on for disposal in May next, and over 4,000 which should be ready for budding during the coming season. Layered plants are also being disposed of as rooted but these are limited to the parent trees available. Buddings include assorted varieties of grape fruit, orange, mandarine, lime, seedless lime, and soursop and gooties include mangosteen, sapodilla, guava, litchi, and lovi lovi.

A further difficulty experienced is in the receipt of bud-wood both in quality and quantity and thanks are due to the Superintendents of Fernandale estate, Rangala; Wye, Bandarawela; Mattakele, Talawakele; Ambalamana, Galaha; and Dr. Rockwood of Colombo for supplies to date. With the increase and growth of the newly imported grafted plants both here and at the Experiment Station, this difficulty should be remedied in course of time.

Ten dozen new rose plants indented for from Australia were received in July last and planted in the new long border. Excellent growth has been made and many of the plants flowered freely. The site seems an ideal one for this type of plant, and successful rose cultivation at Peradeniya now appears probable.

In connection with the chaulmoogra oil experiments at the Experiment Station, Peradeniya, and at the Botanic Gardens, Gampaha, 95 *Taraktogenos* and 400 *Hydnocarpus* were raised, potted into large bamboos, and despatched for planting as follows: 50 *Taraktogenos Kurzii* and 250 *Hydnocarpus Wightiana* to the Experiment Station, Peradeniya, and 45 and 150 respectively to the Botanic Gardens at Henaratgoda.

GENERAL.

The South Garden lake continues to choke rapidly with the lotus lily (*Nelumbium speciosum*) combined with the water weed (*Hydrilla ovalifolia*). The latter has only re-established itself since the flood of July, 1926, and from the investigations made, appears to be associated with the absence of Gourami fish in the lake which formerly kept the weed down. Four Gourami fish were supplied again recently by the Director of the Colombo Museum, and as these increase the water weed should again be kept down satisfactorily.

The cultivations of orchids at Peradeniya has been materially assisted by the glass roofing of the east and west projections by the Public Works Department. This work was completed in September. The roof of the remaining portion and that of the Octogen House—the new plant shed at stores has been covered with open coir matting, afford thereby suitable shade to the contents of these houses.

Two double latrines for the use of the public have been erected in the gardens, one near Nutmeg grove and the other in section F. of Arboretum, by the Public Works Department. These were completed in March and the surroundings have been suitably laid out. Alteration to the garden stores by the insertion of two additional windows and the demolition of the dividing wall here has also been completed by the Public Works Department during the year. Both were long-felt requisites of the gardens.

A gale of wind experienced in March last resulted in much damage to many of the trees in the gardens. A portion of the large *Kleinhovia hospita* tree overhanging the gardens seed store collapsed and totally demolished the seed store. A new seed store, the vote for which was subsequently sanctioned to replace the demolished building, was erected and completed in October last.

The labour force was treated for anchyllostomiasis on April 28 and 29 last.

A serious epidemic of hoof-and-mouth diseases broke out in the gardens on August 12 last, and all precautions in segregation and disinfecting were taken. The attack lasted six weeks during which all the cattle were attacked and one cow died.

The rubber seed crop for 1927 was on the whole a fairly good one, a total of 1,152,600 seed having been collected and disposed of, realizing a sum of Rs. 6,889.50. Seed from group I. was under the estimate at the Experiment Station, Peradeniya, but normal at Henaratgoda, a total of 84,000 seed of this grade being received and disposed of. Group II. produced a plentiful supply from both sources the total amount received and disposed of being 147,000, whilst 918,000 seed of group III. was received and disposed of. This exceeds last year's sales, which amounted Rs. 4,933 realized on a crop of 923,550 seed.

The five talipot palms which commenced to flower in July, 1926, have ripened seeds towards the end of this year. A new Talipot avenue has been formed from seeds sown *in situ* in the South Garden and seeds have been sent to nursery for stock purposes. Supplies have also been sent to the principal botanical stations of the world.

The Davies tree site continues to improve and the trees planted last year have become well established now. The area presents a very neat and tidy appearance and a deal of colour is to be seen at times of the year. Being far from the main road the site is not often visited by the public which is a matter of regret.

Instruction in rubber and fruit budding has been afforded to many applicants during the year, but requests during the past six months show a decline.

OFFICE.

The card indexing of the garden plants progresses slowly owing to the large amount of routine work now involved in the upkeep of the outdoor collection, and in the nursery work, and attention and time needed on the many operations undertaken outdoors this year.

The new guide to the Royal Botanic Gardens was received from the Government Printer early in the year and these are now on sale at Re. 1 per copy.

A list of the plants and seeds usually available in the garden has been made and printed and are on sale at 25 cents per copy. These lists are of considerable assistance in the nursery work here, and to applicants for plants and seeds, the plant list affording a brief description of the individual plants for sale.

VISITORS.

The number of visitors, mostly from abroad, who signed the visitors' book kept at entrance lodge was 3,432.

SALE OF PLANTS AND SEEDS.

The amount realized and credited to revenue for sale of plants and seeds from Peradeniya for the calendar year is Rs. 10,688.60. An increase of Rs. 2,377.46 over last year's receipts and Rs. 4,066.04 over those of 1925. This includes sale of rubber seed from Henaratgoda to the value of Rs. 1,892.50, and from Experiment Station, Peradeniya, of Rs. 4,640.

The value of plants and seeds issued in exchange and free issues to Government institutions, &c., amounted to Rs. 2,272.45. Value of plants, seeds, and cuttings issued free to school gardens amounted to Rs. 562.55.

METEOROLOGICAL.

The following is the rainfall for the year together with the average rainfall for the past forty-four years. The heaviest rainfall in any 24 hours was 3.70 on December 27. Though under the average the rainfall has been fairly well distributed throughout the year.

RAINFALL FOR 1927.

Month.		Inches.	Days.	Average for last 44 Years.	
				Inches.	Days.
January	..	10.37	12	3.89	7
February	..	2.28	4	1.80	4
March	..	5.85	15	4.83	8
April	..	7.58	7	7.85	13
May	..	9.04	17	6.41	11
June	..	6.22	27	10.41	19
July	..	6.20	16	8.17	19
August	..	1.04	11	6.34	16
September	..	8.56	20	7.05	15
October	..	10.36	18	13.21	19
November	..	7.53	18	10.95	17
December	..	5.78	7	8.33	12
		80.81	172	89.24	160

THE GOVERNOR'S AND COLONIAL SECRETARY'S GARDENS.

The Queen's House Garden, Colombo.—Maintenance of the gardens and plant stocks here has been well maintained, all beds and borders being regularly manured and dug and the shrubberies overhauled and pruned.

The pot palms, ferns, &c., have been increased in quantities, new pots and tubs being purchased as and when required. All roads and paths have been kept in good order by the Public Works Department.

Many alterations are in hand and in prospect, a new drive having been made leading to the north wing presently being used as offices, and the surroundings have been suitably laid out. New benches for the plant house have been made erected and the plant contents overhauled.

New pot stands for the decorative plants along the drives are being made at the moment.

The Temple Trees Garden, Colombo.—The beds of cannas bordering the entrance drive have presented a fine show of colour for the greater part of the year. Improvements of a general nature have been made during the year and attention has been given the lawns in the direction of levelling, manuring, and returfing. The shrubberies have received attention in forking and pruning and the road to garage has been touched up and the sides returfed. The front borders, near main road are at present being overhauled and rearranged.

The King's Pavilion Garden, Kandy.—The lower portion of the grounds below plant house has been much improved by closing up the cross path to bungalow keeper's lodge, the filling of all depressions, the planting of hedges, and the formation of beds of flowering plants on the returfed area. The plant house is being overhauled and new roofing material being obtained.

Ten dozen new roses from Australia were obtained in July last and planted in the rose garden here, many of the present stock having become old and thoroughly worn out. The borders throughout have been overhauled, trenched, and manured and additional flowering trees planted at suitable sites on the lawns.

Two large inga trees overhanging the swimming bath have been removed, these having become dangerous to the building owing to shade.

The Lodge Garden, Kandy.—Maintenance of these grounds has been satisfactorily maintained throughout the year, the beds and borders being manured and dug seasonally and all overgrowth pruned back. The verandah pot plants have latterly been attended to and new pots purchased. The demarcation of the boundary of the compound is desired and additional funds required for the erection of a good stout hedge, much damage being caused by cattle trespass.

Queen's Cottage Gardens, Nuwara Eliya.—The Curator, Hakgala, Mr. J. J. Nock, reports:—

This garden has been greatly improved during the year. A good show of flowers was produced during the season, stocks antirrhinums, schizanthus, portulaca, carnations, &c., flowered exceptionally well.

During November, the greater part of the old soil in the beds was replaced by soil from the jungle.

All the paths have been regravelled and put into good order. A large number of seedlings were supplied from Hakgala for the beds.

Twenty beds of carnations, a large bed of gladiolus, and a number of rows of sweet peas have been planted in the cut-flower section.

Eighteen tubs and 400 pots have been planted with petunias, cinerarias, begonias, &c., for use in the porch.

A good supply of vegetable has been maintained throughout the year.

The weeding out of the nymphaeas in the pond has been attended to during the year and this work is to be continued until this lily is eradicated.

Experiments with cutworm were started on March 9, ten beds measuring 10 ft. by 3 ft. being planted with young seedlings. Four of the beds were treated with calcium cyanide and one with sawdust slightly tainted with kerosine oil. In one of the beds treated with calcium cyanide, all plants were eaten off by cutworm by March 30, whereas the control bed showed only twenty-one casualties. Particulars of these experiments have been submitted to the Entomologist.

The cupressus trees on the slope below the flower garden have been thinned out and the ground levelled where necessary.

All the undergrowth on the bank above the lodge, and on the slope above lower pond has been cut out.

A few clumps of streptosolen have been planted along the side of the drive above the Cryptomeria avenue.

A plant of araucaria imbricata, supplied from Hakgala, has been planted out on the corner below the stables, and the corner has been rounded off.

Vacancies in the Cupressus hedge along the main road have been filled with plants from Hakgala, and the hedge has been manured.

Four notice boards, indicating that the grounds are private, have been put up at the two main gates, the little gate near the lower pond, and at the end of the path leading across the golf links from the lodge.

The boundary fence round the cut-flower section has been put into good order.

A hedge has been planted to screen the dhoby's quarters.

The undergrowth round the chauffeur's quarters has been cut out, the summer arbour rethatched, and the surroundings tidied up. A table and benches have been erected in the summer arbour.

The grounds round the staff cottage have been relaid and new beds made and planted.

Branches of the cupressus trees overhanging the lodge have been removed.

The Lodge Garden, Nuwara Eliya.—The Curator, Hakgala, Mr. J. J. Nock, reports:—

This has been kept in good order during the year, and a good show of flowers was produced during February-April.

A number of pear trees in the lower part of the vegetable have been removed.

A barbed wire and wire netting fence has been erected round the vegetable garden by the Public Works Department.

The area at the end of the lower vegetable garden has been cleared and beds have been made and planted up with carnations.

About 50 feet of the well established cupressus hedge, on bank above the drive, has been cut out, and a rockery has been made on the bank. The stones for the rockery were supplied by the Public Works Department.

A certain amount of levelling has been done on the lawn above tennis court and this work is to be continued as labour becomes available.

During November-December, all the beds and borders were well manured and planted with annuals, &c.

Peradeniya, January 13, 1928.

T. H. PARSONS,
Curator, Royal Botanic Gardens.

HENARATGODA BOTANIC GARDENS.

THE year under review has been a very strenuous one, good many improvements having being effected and many new works undertaken.

Cultivation of Chaulmoogra.—By clearing a portion of the old mukalana jungle the plantation was extended by about $1\frac{1}{2}$ acres. Thirty-four one year old seedling plants of *Taraktogenos Kurzii* were set out in well prepared holes. Arrangements have been made to secure more seeds from Burma to complete the plot. Another portion of the jungle, about $1\frac{1}{2}$ acres in extent, to the left of the Livistona avenue was also cleared for the reception of 128 *Hydnocarpus Wightiana* an allied species of the former; the oil of these two species is used in the treatment of leprosy. *Dolichos Hosei* has proved to be an excellent ground cover in the plots.

Flower Garden.—This section was maintained in good order and several improvements effected. The beds of *Celosia plumosa*, *Spathoglottis plicata*, *Ruellia tuberosa*, *Torenia Fournieri*, *Turnera ulmifolia*, and *Tricholaena rosea*, all made very conspicuous display of flowers. The row of specimen flowering climbers has been improved by the addition of *Aristolochia gigas*, *Congea tomentosa* var. *azurea*, and four named varieties of *Bougainvilleae*.

Owing to the lack of space in the conservatory forty well grown orchids were transferred into tubs and placed on the lawn outside. The collection of orchids was improved by the addition of a good many species, including the following:—*Rhynchosstylis retusa*, *Vanda Roxburghii*, *V. teres*, *Dendrobium MacCarthae*, *Phaius Wallichii*, and *Arundina bambusaefolia*. The "scorpion" orchid, *Aracnanthe Maingayi* produced 897 and *Rhynchosstylis retusa* 37 blooms, the former in October and the latter in May.

Tapping Experiments.—From April the six hevea rubber plots consisting of 460 trees of varying ages have been put under tapping experiments, the period to extend for one year, for the selection of high-yielding strains for the purpose of obtaining bud-wood. The trees are tapped one-third circumference at an angle of 16° at a height of 24 inches from ground. The latex is separately collected and coagulated and weighed monthly.

Nursery for Budding.—A small nursery has been established with 150 rubber stumps of two years old and 1,000 of one year old to provide stocks for budding purposes.

Drives.—A good deal of attention was paid to the proper maintenance of roads and walks. The drives through the Palm and Brownea avenues have been thoroughly overhauled and consolidated.

RECENT INTRODUCTIONS WITH BRIEF NOTES.

Derris elliptica.—An interesting insecticidal leguminous climbing plant of Burma planted in 1926 is growing well.

Melaleuca leucodendron var. *minor* (Cajeput-oil trees).—Introduced at the latter part of 1926 are thriving remarkably well with an average height of 4 feet.

Dalbergia assamica.—These have been well established, the average height being 7 feet. The plant is widely used in India and Assam for providing shade in tea plantations.

Terminalia Kernbachii (Okari nut).—A fruit tree of New Guinea introduced and planted early this year has made good progress and is about 5 feet high.

Aleurites trisperma (Chinese wood oil) planted in 1919, fruited in May for the first time. The average height of the trees is 25 feet.

Aleurites Fordii and *A. montana* also known as Chinese wood oil, planted in 1925 have become established. The former with an average height of 9 feet and the latter 11 feet respectively.

MISCELLANEOUS.

Thirty hevea rubber trees that have so far been reckoned as high yielders have been pollarded to provide bud-wood for budding purposes.

225 feet of bud-wood from No. 2 Henaratgoda and 95 feet from other high-yielding trees have been supplied.

On the whole the main rubber seed crop of the three grades 298,000 in number is poor compared with the previous year's yield which amounted to 412,100. This shortage could be attributed to the fact that the plantations are being put under experimental tapping.

Sign Board.—A permanent sign board with glazed enamel characters indicating the position of the gardens was fixed at the junction of the approach road in place of the old wooden one.

Guide Book.—An illustrated Guide Book to the Henaratgoda Botanic Gardens was printed and is now available at Re. 1 per copy.

Right of Way.—The construction of a new road by the District Road Committee outside the gardens, leading to the neighbouring village Karandenigoda has terminated the right of way through the gardens by the villagers from its very inception.

<i>Receipts.</i>		Rs.	c.
The amount credited to revenue from sale of plants, &c.	..	1,477	35
The amount credited to revenue under Head 3, Fines and Forfeitures	..	3	75
The amount credited to revenue under Head 4, Sundries (Guide Books)	..	46	0
The amount credited to revenue through Royal Botanic Gardens, Peradeniya (rubber seeds)	..	1,892	50
The amount credited to revenue through Experiment Station (rubber)	..	1,479	0
Total	..	4,898	60

The value of free issues to Government institutions, Rs. 525·62.

Rainfall for 1927.

	Inches.	Days.
January	4·74	9
February	3·81	9
March	7·21	14
April	20·49	11
May	23·66	26
June	8·83	25
July	2·18	9
August	1·35	6
September	13·60	19
October	12·37	16
November	10·44	13
December	3·25	4
	111·93	161

K. J. ALEX. SYLVA,

January 17, 1927.

Assistant Curator, Henaratgoda Botanic Gardens.

III.—ANNUAL REPORT OF THE HAKGALA AND NUWARA ELIYA BOTANIC GARDENS FOR 1927.

HAKGALA GARDEN.

ROCK GARDEN.

DURING the early part of the year a good deal of planting was done, especially in the Ceylon section.

In the upper section, plants of *Oenothera* "America," raised from seeds received from California, have flowered well. The flowers are white and are nearly three times as large as those of the evening primrose found growing locally.

Fragaria indica has also made a good show in this section, the pale yellow flowers being followed by large, red fruits.

In the Ceylon section, the following have become well established and have flowered well during the year:—*Phaius Wallichii*, *Biophytum proliferum*, *Anotis nummularia*, *Spilanthes Acmella*, *Viola serpens*, *Justicia procumbens*, *Exacum macranthum*, *Parochetus communis*, *Osbeckia rubicunda*, and several species of *Impatiens*.

A collection of indigenous plants, collected by the Systematic Botanist, were planted out during November.

The whole garden received a good overhauling during November and December, when the usual manuring and replanting was attended to.

Sambhur continued to regularly visit the garden during the year and a good deal of damage was done by these animals.

FERNERY.

2. This was overhauled during the early part of the year, when a good deal of replanting was done, and the paths put into good order.

The bridges have been repaired and the beds and borders have been kept tidy.

To keep the fernery in really good order, more labour is badly needed. If labour was available this portion of the garden could be considerably improved and extended.

BULB GARDEN.

3. A good show of flowers has been kept up during the year and the garden received a good overhauling during November, when the necessary manuring was done, and the beds replanted.

A collection of dalias are on order from Holland and beds have been reserved for these.

A collection of seven kinds of narcissus, and bulbs of montbretia "Eldorado" have been received from Lieut.-Colonel R. J. L. Ogilvy, D.S.O., of Moreton Hall, Warwick, and have been planted out. These were received in exchange for seeds given to Lieut.-Colonel Ogilvy when he visited Hakgala.

Two large mirror carp, from the pond in Nuwara Eliya Park were put into the pond early in the year.

Tigridias, received from Holland last year, have flowered very well.

AREA BELOW STORE ROOM.

4. A good deal of labour has been used in connection with the improvements to this area.

The sides of the ravine have been sloped and planted with grass.

A retaining wall, 18 inches high, has been built along the bottom of the slope each side and the drain paved with stones.

The path leading from the storeroom to the visitors' garage has been entirely remade and a good stone-edged drain built along one side of same.

The beds at the end of the pits and orchid house have been built up with stone and cement.

The tree overhanging the orchid house has been removed and the bank resloped and turfed.

A row of azaleas has been planted along the bank near the pits.

A guttering has been fitted along the front of the storeroom roof by the Public Works Department, and the open drain along the base of the wall of the building has been filled in.

PLANTING.

5. A plot on the patana above the Camphor plantation has been planted up with 44 plants of *Melaleuca leucadendron* var. *minor*—cajeput oil tree—raised from the tree near upper pond. The plants are growing very well.

On the patana above the timber trial plot, 19 plants of *Araucaria imbricata*, raised from seed received from Mrs. Keith Rollo, Nuwara Eliya, have been put out.

The following have been planted in the Arboretum opposite and below the plant sheds:—*Libocedrus macrolepis* (3), *Cupressus Lawsoniana* (2), *Araucaria imbricata* (2), and *Pinus Montezumae* (?), 1.

A collection of bougainvilleas, received from the Curator, Royal Botanic Gardens, Peradeniya, have been planted out on the paspalum lawn below the bungalow, and along the bank above Rock Garden.

In January the following plants were put out in the Eucalyptus plantation:—*Eucalyptus botryoides* (5), *E. Globulus* (5), *E. ficifolia* (5), *E. maculata* var. *citriodora* (5), and *E. amygdalina* (5).

FRUIT PLOTS.

6. These have received a thorough overhauling.

A new barbed wire and wire netting fence has been put up round the plots and the surroundings have been tidied up.

In the lower plot, two plants of each of the following loquats received from California were planted out on May 19, but several of the plants have died:—Advance, champagne, early red, premier and thales. Vacancies in this plot were filled with plums, peaches, guavas, raspberries, &c.

The row of stones at the lower end of this plot has been removed and used for building up the sides of the ravine opposite the pits.

The upper plot has levelled off and a new bank made at the upper end. Holes have been prepared and planted up with 15 plants of peach, tree tomato, and passion fruit.

Two new flights of steps have been built between the two plots, drains attended to, and the paths remade.

The Cherimoyer plants in the upper plot have been given a dressing of artificial manure.

The following were planted out during October:—

Oranges.—One of each—Navel, Jaffna, Thardiff, L. G. Gong, Parson Brown, and Pineapple.

Grape Fruit.—Conner's Prolific, Walters, Foster, and Pernambuco.

Tangerines.—King, Dancy, Portugal.

Tangelos.—Thornton and Sampson.

FODDER GRASS TRIALS.

7. Seed of kudzu vine, received from the Yokohama Nursery Co., Ltd., was sown during March and germinated well, but the seedlings died off.

The lowest section of the plot has been planted up with a grass which does well at Hakgala. It has not been possible to identify the grass as it has not yet flowered here.

A section was sown with sulla in December 1926. The seed germinated well, but the seedlings died.

Seed of various kinds of grasses, &c., has been received from Australia and is to be planted out immediately. Three sections in the plot have been prepared for the purpose.

A row of *Furcraea* sp. has been planted round the jungle side of the plot.

Thirteen plants of each of the following have been planted out in the plot:—*Albizia lophantha*, *Dalbergia assamica*, *Acacia pruinosa*, and *Pithecolobium subcoriaceum*. The latter have made practically no growth during the year.

Plants of *Leucaena glauca* have been planted throughout the plot, but it is very doubtful whether they will thrive.

A certain amount of damage has been done in the plot by wild pig, sambhur, and hare.

PLANT SHEDS.

8. The two double sheds in the fruit plot have been demolished and the materials have been used for building three single sheds in which to raise seedlings, &c.

The road to the rubbish yard near the plant sheds has been completed and the surroundings have been tidied up.

A new barbed wire and wire netting fence, with sawn timber posts, liquid-fuelled and embedded in concrete, has been erected round the sheds.

The building of new seed beds in the sheds has nearly been completed.

The oxalis-infested soil in the plant sheds area has been removed and used for mulching the grassed area opposite the Rose Garden.

Five new flights of steps have been built along the north side of the sheds and a retaining wall along the inside of the fence on the same side.

All the drains round and between the sheds have been rebuilt, the path along the north side remade and the drain along same rebuilt.

All the banks between the sheds have been remade and planted up with dwarf daisy to prevent wash, and the terraces have been levelled.

New shelves on which to place seed boxes have been put up, the shelves being supported by angle-iron pieces which have been bolted to the iron posts of the sheds.

Plants of *Fuchsia splendens* have been planted to cover the fence on the north side.

The improvements to the sheds have taken a good deal of labour and time.

GENERAL.

9. The grassed area below the plant sheds has been tidied up and plants of *alsophila* have been planted along the edges of the stream.

The area above the greenhouse has been tidied up and the undergrowth removed.

The summer house below the lower pond has been rethatched.

The roof of the summer arbour near upper pond has been reshingled and the seats have been put into good order.

The sides of the ravine below lower flower garden have been built up with stones and the Arboretum between this and the Nock Memorial has been tidied up.

The area between the lower drive and lower garden path has been given attention, all undergrowth being removed.

The tree overhanging the orchid house has been removed and the ground sloped and turfed over.

The coarse grass on the lawn in the lower flower garden and above the Nock Memorial has been dug out and the lawns topdressed.

Wild pig did considerable damage in the nursery during July. Most of the beds in the north-east portion of the nursery were dug up, and also the *Paspalum* grass on the banks.

Seed of Seville orange has been supplied to the Curator, Royal Botanic Gardens, Peradeniya, and the Manager, Experiment Station, Peradeniya, for raising stocks for budding purposes.

A new path has been made through the Arboretum below the plant sheds and suitable drains have been made to carry off the water from the plant sheds.

A coloured plan of the gardens has been framed and hung in the visitors' shelter.

Concrete stagings have been erected in the south end of the greenhouse by the Public Works Department, and the stoke-hole roof has been reshingled.

LABORATORY.

10. A new corrugated iron roof has been put on the laboratory by the Public Works Department, who have also renewed the ceiling cloth, completed the cement drains, and rebuilt the steps.

A number of articles of furniture, &c., have been purchased during the year, and a stove has been fixed in the kitchen.

The undergrowth surrounding the building has been cleared and the building has been kept in good order.

CATTLE SHED.

11. The cattle shed has been rebuilt by the Public Works Department on a site near the cooly lines.

A loft has been made along the main beams of the roof for storing bedding.

A cover manure pit has been made on the west side of the building and has been enclosed with corrugated iron sheets.

INTRODUCTIONS.

12. Plants and seeds have been received from the following:—The Superintendent, Maymyo Government Botanic Gardens, Burma; the Conservator of Forests, Sumatra; the Director, Station Botanique de Brignoles, France; M. le Directeur de la Ville Lyon, France; the Director, Botanic Gardens, Cambridge University; Mr. Luther Burbank, Santa Rosa, California; the Botanic Gardens, Imperial University, Tokyo, Japan; the Director, United States Department of Agriculture; Professor Juan Balme, Mexico; Mr. Julian Parr, Cannes, France; Vilmorin, Andrieux and Cie, Paris; the Manager, Government Cinchona Plantation, Munsong, Kalimpong P. O., Bengal.

And from the following in the Island:—Mr. R. M. C. Jones, Leangawella, Haputale; Mrs. F. C. Loos, Nuwara Eliya; Mr. W. P. Jacocks, Homeleigh, Castle street, Colombo; Mr. A. W. Clarke, Nuwara Eliya; Mrs. Rollo, Nuwara Eliya.

REVENUE.

13. The amount realized by sales of plants and seeds for the twelve months ended December 31, was Rs. 1,548.05, and for the twelve months ended September 30, Rs. 1,329.88.

The value of plants and seed issued gratis or in exchange to Government institutions, &c., was Rs. 628.50.

METEOROLOGICAL.

14. The number of inches of rain recorded during the year was 139.05, falling on 248 days, compared to 94.11, falling on 213 days during 1926.

The wettest month was January with 21.15 inches, and driest month August, with 6.02 inches.

The highest temperature in the sun's rays was 154.1 on April 8, compared to 157.6 on February 21, of the previous year.

The lowest temperature on the grass was 40.5 on January 11, compared to 33.3 on January 19 of 1926.

NUWARA ELIYA GARDEN.

SEVERAL improvements have been carried out in this garden during the year.

The sloping and turfing of the bank between the summer harbour and the river has been completed.

The lowlying ground between the trees in Cupressus avenue has been filled in and turfed over.

The path along the side of the avenue has been remade, new verges laid, and the path straightened.

The lower branches of the trees in the avenue have been removed.

Coarse grass (*Sporobolus*) has been removed from the lawns which have been returned where necessary.

Four new seats have been made and put out. Other seats have been repaired and the arches put into good order.

Four seats have been fixed to the ground by means of iron bolts driven through the legs, to prevent their being moved by visitors to the garden.

The gates and notice boards have been painted, and the gate near lodge repaired.

A good deal of labour has been used for digging out the white weed in the lawns in the centre of the garden.

Six plants of *Cupressus sempervirens* var. *fastigiata* have been planted out near the entrance to the maze. These were raised from seed received from Mr. R. M. C. Jones, Leangawella, Haputale.

Three plants of *Araucaria imbricata* have been planted on the slope below Park road.

The path leading from the entrance to the garden near the Convent to the main drive has been edged with stone and remade.

The stumps of *Acacia decurrens* in the area above new flower garden have been rooted out and the ground turfed.

Seedlings of cupressus have been raised and 1,000 have been put into baskets and are to be used for filling vacancies round the boundary fence.

The chief work during the latter part of the year was in connection with the digging, manuring, and planting of beds and borders and the weeding and pruning of the shrubberies.

The Nymphaeas in the pond near the lodge have been weeded out four times during the year and this weed has been practically eradicated.

An estimate for the building of a new summer harbour near the Jubilee Oak has been submitted to the Chairman, Board of Improvement, through the Director of Agriculture, and it is hoped that the new building will be completed early in 1928.

The renewal of the boundary fence along Park road is receiving the attention of the Board of Improvement.

JAMES NOCK,
Curator.

January 17, 1928.

CEYLON

Scale, 24 Miles to an Inch

MILES 24 18 12 6 0 24 MILES

REFERENCE

- ROADS
- RAILWAY EXISTING
- DO UNDER CONSTRUCTION
- DO UNDER SURVEY
- PROVINCE BOUNDARY
- DISTRICT BOUNDARY
- RAINFALL (1927 AVERAGE CURVE)
- TEMPERATURE

- RUBBER
- TEA
- COCONUT
- CADAO

- | EXISTING | PROPOSED |
|----------|----------|
| ● | ○ |
| ◆ | ◇ |
| ○ | ○ |
| ■ | ■ |
| + | + |
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